Non-Marital Fertility in Europe: Development, Parents' Socioeconomic Resources and Social Context

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1 Introduction

This study examines the development of childbearing outside of marriage in Europe over the last decades and the diversity in rates of non-marital fertility observed throughout Europe today. It is designed as a large scale cross-national comparison and looks to test both micro- and macro-level explanations. The study seeks to examine the socio-economic background of parents who have a child in different family forms, with a focus on the comparison of married and cohabiting couples. Furthermore, it seeks to understand to what extant national contexts shape parents' decisions to have a child within or outside marriage.

Over the last decades, Europe has witnessed marked increases in childbearing outside of marriage. In 2012, 40 percent of all births in the European Union were to unmarried mothers (Eurostat 2016). Throughout Europe, the proportion of births outside of marriage has been rising steadily since the late 1960s. The period from 1950 to the early 1970s was characterized by unusually high levels of marriage in Europe (Kiernan 2004, p. 35; Huinink and Konietzka 2007, p. 70) and is sometimes referred to as the "golden age of marriage" (Festy 1980). During this period, rates of childbearing outside of marriage were at historically low levels in most parts of Europe (compare for example data presented by Höpflinger 1985). The pattern of marked increase could first be observed in the countries of Northern Europe from the late 1960s onward.[1] By the mid to late seventies, rates had also begun to increase in most countries of Central and Western Europe. The development was more delayed in Southern European countries. In Greece and Cyprus, rates of non-marital fertility are still low today but have begun to increase in the latter part of the last decade. In most post-socialist countries of Eastern Europe, dramatic increases could be observed after the end of state socialism. While childbearing outside of marriage has increased considerably in most countries over the last decades, there is still considerable diversity in prevalence throughout Europe, with rates ranging from 8 percent in Greece to 67 percent in Iceland in 2012 (Eurostat 2016).

Childbearing outside of marriage is often seen as a central aspect of family change (Perelli-Harris et al. 2010), and is associated with changed patterns of family formation behavior and increased diversity in the life course of young people (Sobotka and Toulemon 2008). The traditional sequence of marriage followed by childbirth, which was a characteristic of the "golden age of marriage," has given way to a multitude of paths to family formation. Empirically, the rise in rates of non-marital fertility can be attributed largely to increases in childbearing to cohabiting couples rather than to single mothers (Kiernan 1998; Perelli-Harris et al. 2012). The underlying change in demographic behavior which is seen as chiefly responsible is the decline in shotgun marriages, i.e. marriages which take place between the conception and the birth of a child. This association has been documented in a number of studies which examine marriage following unmarried pregnancies over time.[2]

1 For a detailed overview of trends, compare Sprangers and Garrsen (2003) and Klüsener (2015) as well as Chapter 3.1 of this study.

2 See for example Steele et al. (2006) for the UK, Baranowska (2011) for Poland, Hărăguş (2015) for Hungary, Romania and Bulgaria. For comparative evidence see Sobotka and Toulemon (2008, p.113) and Perelli-Harris et al. (2012).

The question which demographic behaviors are responsible for the general pattern of increases in non-marital fertility in Europe is not one that is heavily debated. However, it is far from clear which social processes underlie the development, which subgroups of society are chiefly responsible, and whether different processes are at work in different parts of Europe. In a recent comparative European study of childbearing in cohabitation, Lappegård, Klüsener and Vignoli (2014) noticed a lack of coherent theoretical explanations. This study aims to contribute to the research on non-marital fertility by attempting to understand individual decision making of parents as nested within specific national contexts and by attempting to disentangle the various social phenomena which are associated with changing patterns of childbearing outside marriage.

The increases in non-marital fertility observed in Europe over the last decades are often described as a consequence of large scale societal transformation processes. Modernization theorists such as Inglehart argue that changes in family relations can largely be attributed to changes in women's role in society (Inglehart and Norris 2003). The increased importance of the tertiary sector (Bell 1973) and the subsequent rise in female employment (Fagan, Rubery and Smith 2003, p. 1; Inglehart and Norris 2003, p. 14) have reshaped gender relations and lead to a move away from the male breadwinner model, which was the dominant mode of division of labor in families during the "golden age of marriage." Within this societal transformation, a number of key process which heralded increases in childbearing outside of marriage can be identified. On the one hand, the educational expansion, which has led to delays in time point of marriage and a wider prevalence of cohabitation as a strategy of partners to avoid planning uncertainty (Oppenheimer 1988), is often emphasized. On the other hand, women's increasing involvement in the labor market is seen as key to their economic independence (Becker 1991) and the development of more egalitarian perceptions of gender roles (Inglehart and Norris 2003).

While modernization theories provide a vivid narrative of societal transformation, they tend to be less interested in identifying causal mechanisms than in painting a picture with broad strokes. Economic, institutional and value changes tend to be seen as tightly interrelated (Welzel and Inglehart 2005), and cause and effect often cannot be clearly identified. A framework from the discipline of demography, which bears many similarities to the modernization theories developed within sociology, is the second demographic transition (Van de Kaa 1987). The second demographic transition describes the demographic upheaval which took place in Northern and Central Europe from the 1960s onwards. Developments such as declining fertility and marriage rates, increasing divorce rates and changes in patterns of household formation are subsumed under the mantle of the second demographic transition. The proponents of the second demographic transition ascribe considerable importance to changes in values and attitudes for explaining these demographic changes, and specifically reference Inglehart's (1977) ideas on the post-materialist shift. However, they also emphasize the impact of technological innovations and changes in the economy.

While even its key proponents do not perceive the second demographic transition as a theory (Van de Kaa 2009, p. 93), it serves as an important theoretical reference point for most recent European research on the topic of non-marital fertility. In regards to non-marital fertility, the second demographic transition argues that adaption of new family forms such as pre-marital cohabitation and childbearing outside of marriage are consequences of the availability of new contraceptives. These allowed for pre-marital sexual intercourse

without the risk of pregnancy. Due to this technological innovation marriage no longer holds a monopoly status as a place for intimate relationships. Subsequently, premarital cohabitation is established as an accepted social institution (Van de Kaa 2009, p. 75), and the stigma attached to non-marital parenthood declines, making it a feasible practice (Van de Kaa 1987, p. 25). The second demographic transition argues that it is mainly young people with progressive attitudes who are first to adapt such new family forms as individualized life style choices (Van de Kaa 1987, p. 5 ff.).

However, this perspective is contrasted by a number of approaches which associate non-marital fertility with economic hardship and insecurity. An argument which has surfaced more recently in the European context and which was chiefly promoted by Hans-Peter Blossfeld and associates (Mills and Blossfeld 2005), is the idea that globalization has heavily impacted the lives of young people and drastically reduced the planning security in young people's life course. Mills and Blossfeld argue that planning uncertainty also affects family formation processes. In doing so, they base their argument on ideas proposed by Oppenheimer (1988), who argues that marriage decisions are not only influenced by the current economic situation but also by future economic prospects of potential spouses. While non-marital fertility is not explicitly examined in the work of Mills and Blossfeld (2005), a number of recent studies have examined the association of economic uncertainty, oftentimes operationalized via aggregate unemployment rates, and childbearing outside marriage (Lappegård, Klüsener and Vignoli 2014; Štípková 2015; Vitali, Aassve and Lappegård 2015).

Other approaches which link unemployment with childbearing outside marriage focus more on parents' individual characteristics. Wilson (1987) proposes that it is a lack of marriageable men, i.e. men who can fulfill the breadwinner role in families, which leads young African American mothers in the U.S. to forego marriage. This argument is interesting, as it emphasizes the importance of the economic situation of fathers.

Other authors argue that the changing role of marriage within society, as a symbol of status and social achievement, might actually be responsible for the association of economic disadvantage and non-marital fertility (Edin and Kefalas 2005; Gibson-Davis, Edin and McLanahan 2005). Based on Cherlin's (2004) idea that the symbolic value of marriage has actually increased as it becomes less common, Edin and Kefalas (2005, p. 202 ff.) argue that lower class women delay getting married, but still have children early in the life course. It is argued that these women do not deem themselves or their partners fit to get married, as they have not yet attained what they perceive as the prerequisites of marriage. The fact that there exist different prerequisites of childbearing and marriage is seen as responsible for the disconnection of these processes (Gibson-Davis 2009, p. 146). In the European context this position is becoming more popular and is advocated most vocally by Brienna Perelli-Harris (Perelli-Harris et al. 2010; Perelli-Harris and Gerber 2011), who argues that the negative association between educational attainment and childbearing in cohabitation can be understood as a pattern of disadvantage.

By contrast, supporters of the New Home Economics argue that higher levels of female education are associated with higher earnings potential and increased economic independence of women (Becker 1991). This reduces the gains to a specialized division of labor and thus to marriage (Becker 1991, p. 350 ff.), and this declining attractiveness of marriage is in turn associated with non-marital fertility (Becker 1991, p. 55). While there is considerable empirical evidence for a number of countries in Europe that the association between

childbearing outside of marriage and the educational level of mothers is negative (Kiernan and Smith 2003; Perelli-Harris et al. 2010; Potârcă et al. 2013; Gavalas, Rontos and Salvati 2013; Lappegård et al. 2014; Štípková 2015), it is less clear whether this pattern is truly universal. The most prominent article on the topic (Perelli-Harris et al. 2010) actually finds considerable variation in the degree of the negative educational gradient among the eight countries under study. In fact, in Italy Perelli-Harris et al. (2010) observe a positive educational gradient of childbearing in cohabitation. Similarly, Stropnik and Šircelj (2008) find that childbearing outside of marriage in Slovenia tends to be associated with higher levels of education in recent times. Konietzka and Kreyenfeld (2005) find a similar association for Western Germany and Hărăguş (2015) observes a positive association in Hungary.

The discussion above highlights the large number of potential explanations for the increase of childbearing outside marriage. Similarly, the large degree of variation observed throughout Europe today is not yet fully understood. Some of the proposed approaches seek explanations at the macro-level, while others place a strong focus on individual decision making. Some approaches emphasize the importance of values, while others emphasize economic factors. An aspect not discussed above which also plays a role in the literature, but which will not feature prominently in this study, are legal boundary conditions and transfer payments (compare for example Konietzka and Kreyenfeld 2005; Perelli-Harris and Sanchez Gassen 2012; Sanchez Gassen and Perelli-Harris 2015).[3] This study takes the perspective that parents' decision whether or not to be married when a child is born can be understood as the result of a rational decision making processes. While this approach is heavily inspired by New Home Economics, I argue that this decision making processes must consider not only the economic implications of marriage but also the potential social costs of non-marriage. The planned division of market work between partners, long-term planning security, and the social stigma associated with non-marital fertility, should all play into the decision making process. Furthermore, it is argued that these factors are very much dependent on the specific national boundary conditions, such as the prevalent social norms, the welfare state arrangements, or the state of the labor market.

I will here provide a short summary of the objectives of this study and the implications for the research design. This thesis follows three key objectives:

1. Provide a comprehensive overview of the development of non-marital fertility in Europe on the basis of comparative individual and country level data.
2. Examine the role of mothers' and fathers' resources in decision making.
3. Examine whether the effect of parents' socioeconomic resources varies between national contexts.

The analysis strategy of this study is heavily motivated by these key objectives. The first objective is largely inspired by a relative lack of comparative studies which cover the entirety of Europe.[4] Thus a data source was sought which provides a broad coverage of

3 Section 3.3 provides an overview of legal boundary conditions. However, they are not considered in the multivariate analysis in Chapter 4.

4 Since I set out to write this thesis in 2011, a number of articles by Klüsener (Klüsener, Perelli-Harris and Sanchez Gassen 2013; Klüsener 2015), have provided a very detailed descriptive

European countries, ideally over a long period of time. As no comparative microdata are available which cover extended time periods for all parts of Europe, the analysis of long-term developments in non-marital fertility necessitated country level data to describe these trends. Thus the analysis presented here is subdivided into two sections. The first is based on country level data and examines long-term time trends in rates of childbearing outside of marriage. The second employs both individual level data, from the European Statistics on Income and Living Conditions (EU-SILC), and country level data in a multilevel framework, and aims to examine current patterns and contextual effects.

As indicated above, this research is more interested in the social mechanisms and parents' decision making than in the underlying population processes. This study aims to understand why soon to be parents choose not to marry, regardless of whether this decision is made when moving in together, when realizing that they are expecting a child, or sometime in between. This perspective implies an analytical focus on marriage decisions and that one considers the role of both fathers and mothers in decision making. Following arguments proposed by Cherlin (2004), who sees marriage decisions as bargaining processes between partners, this study will attempt to bring men back into the discussion. This needs to be emphasized here as most recent European research which inquires on the topic of non-marital fertility tends to focus solely on mothers. The decision to consider the characteristics of fathers does bring with it the disadvantage that such an analysis precludes single mothers, as information on non-resident fathers is not commonly collected in social surveys. Thus this thesis will mainly be comparing parents who have a child within a cohabiting union to those who have a child in marriage. In doing so, I recur to the assumption that the utility of marriage is greatest when partners practice a specialized division of labor (Becker 1991), while cohabiting unions benefit from a more egalitarian division of duties and power (Brines and Joyner 1999).

My third objective is chiefly motivated by the fact that the findings from previous research in regards to the association of parents' socioeconomic resources and their marriage status at the time of birth show considerable discrepancies between countries. I argue that universal theories which assume that explanations should hold regardless of time and place, might underestimate the complexity of the phenomenon. In addition, simultaneous developments in childbearing outside of marriage in different countries might be the result of behavioral changes in different subgroups of these societies. The focus on the contextual nature of decision making needs to be emphasized as it sets this study apart from previous research. Thus, this study is devised as a large scale cross-national comparison. Specifically, it is assumed that the effect of fathers' socioeconomic resources for explaining the marriage status of parents should be largely independent of context, while the effect of mothers' socioeconomic resources (specifically education) is expected to vary between countries. Oppenheimer (1994, p. 315) argues that women's socioeconomic characteristics likely have both positive and negative effects on marital behavior. While the arguments proposed by Edin and Kefalas (2005) would predict a positive status effect of women's education, the logic of the New Home Economics (Becker 1991) would lead to the expectation of a positive independence effect. However, such an independence effect can only be relevant in situations where mothers can actually utilize their socio-economic resources in

overview of non-marital fertility at the level of countries and regions.

the labor market. Thus, the degree of compatibility of work and family life in a country is expected to moderate the effect of mothers' education.

As can be seen from this short discussion, a large variety of potential explanations can be found in the literature. This thesis aims to combine a number of these approaches. While it aims to provide a broad perspective on the development of non-marital fertility in Europe, the analytical focus is placed on childbearing to cohabiting parents and how they are different from parents who are married when a child is born. The power of a large scale cross-national research designed is harnessed in order to contextualize parents' decision making processes. Chapter 2 will further elaborate on the theoretical approaches outlined here and will develop five hypotheses which shall guide the subsequent analysis. The discussion of theory considers both micro- and macro-level approaches. This Chapter will address norms and attitudes but the core formulation revolves around how parents' socioeconomic position shapes their decision making. Chapter 3 is intended to provide contextual information and will be structured in three subchapters. Section 3.1 details the development of non-marital fertility ratios in Europe from 1960 onwards. Section 3.2 sketches the context of non-marital fertility by presenting country level statistics on attitudes, economic conditions and legal and institutional boundary conditions. Section 3.3 provides an overview of existing empirical research with a focus on Europe. Chapter 4 presents the results of multivariate analysis. Section 4.1 includes a country level analysis which employs the data from 1980 to 2010 and specifies time-series cross-section regression models (Beck and Katz 1995). The second part of this chapter presents the results of multilevel analysis on the basis of the EU-SILC. Chapter 5 summarizes results, critically reflects on the research findings, situates them within the literature, and contemplates avenues for future research and policy implications.

2 Theorizing Non-Marital Fertility

This chapter lays the theoretical foundations of this study and develops working hypotheses, which shall be tested in the subsequent empirical analysis. I discuss theories which operate at the micro-level, and focus on individual rational decision making or bargaining between partners, as well as macro-level theories which consider the large scale societal changes reshaping the boundary conditions of individual decision making. While the topics of interest to sociologists tend to be societal phenomena, one such example being the rise in the proportion of non-marital births in Europe, explanations for these phenomena must be sought in the behavior of individuals. The classic model of sociological explanation (Coleman 1994, Esser 2002), assumes that macro conditions constrain the behavior of individuals, but looks to their individual decision making to explain aggregate phenomena. Thus, I will attempt to develop three types of hypotheses.

1) Micro-level hypotheses which assume that socioeconomic resources of parents determine their family status at time of first birth. This includes the independence, status attainment and insecurity hypotheses.
2) Macro-level hypotheses which assume a direct effect of macro conditions on the decision to marry or cohabit at the time of childbirth. This includes the gender equality and normative backing of marriage hypothesis. For the uncertainty hypothesis, I propose that the effect of insecurity will not only function individually but also at the country level.
3) Finally, contextual hypotheses which propose that certain country level factors moderate the effect of individual characteristics of parents. Both the status attainment and independence hypotheses assume mediating effects of societal boundary conditions.

The focus of this discussion will be placed on parents' decision to have a child in cohabitation or marriage. I conceive of parents' decision to have a child within or outside marriage as a marriage decision under the premise that a child is present. As I attempt to construct an argument about rational decision making, placing the focus on marriage behavior makes sense as marriage can always be assumed to be a planned act, whereas childbearing is not always planned. As a number of the authors discussed below, such as Becker or Oppenheimer, see marriage and childbearing as interrelated processes (Gibson-Davis 2008), a focus on marriage behavior makes it much easier to build on these theories. In developing my hypotheses, I will, however, attempt to emphasize how the presence of children alters parents' decision making. Furthermore, empirical evidence suggests that increases in childbearing outside of marriage can be understood more as a consequence of changes in marriage behavior than through changed fertility behavior (Gray, Stokard and Stone 2006; Gibson-Davis 2011).

My other reasoning for focusing on marriage is motivated by the fact that for my analysis I will be employing cross-sectional data, and thus cannot study transitions into parenthood. Instead I will attempt to simulate first births by studying partners at the time of childbirth, specifically the birth of the first child in the household. Such a cross-sectional research design brings with it a further issue: that of marriage timing. This is problematic as my data contains no information on whether parents married shortly before childbirth

or many years in advance, and the socioeconomic characteristics measured at the time of birth might be different from those at the time of marriage. The solution I propose for this dilemma is the following auxiliary hypothesis: The decision to marry implies the decision not to have a child outside of marriage. This applies to the near future (e.g. shotgun marriages), to the distant future, and to cases in which a child is planned or unplanned. Implicit in this assumption is the idea that a marital partner is also perceived as a potential partner for having children.

Following Cherlin (2000), I argue that marriage decisions should be understood as bargaining processes between partners. This decision making is defined by parents' relative position to one another, the anticipated or planned division of labor and their position in society as a whole. In this thinking partners who control more socio-economic resources have more power in marital bargaining processes. The focus on decision making in partnerships implies a focus on childbearing in unions, and thus to largely disregard childbearing to single mothers. A key assumption which will be guiding my analysis, is the idea that the division of labor within families is of great importance for determining the choice between cohabitation and marriage (compare Brines and Joyner 1999 or Köppen 2011). In order to better understand these decision making processes, I will first discuss the advantages and disadvantages of cohabitation and marriage before considering how social contexts can affect individuals' decision making.

One of the defining differences between cohabitation and marriage is the contractual nature, which brings with it a number of implications. First and foremost, a marriage contract protects both partners against possible abandonment. This aspect is particularly relevant for mothers in the traditional male breadwinner family, as they are economically dependent on their spouse (Becker 1991, p. 43 ff.). The contractual nature of marriage means it is harder to separate than a cohabiting union and thus is better suited to insure partners who practice an unequal division of labor, in which one partner is mainly responsible for household related tasks and the other is responsible for generating the families' income. A cohabitating union on the other hand is more easily separated and thus allows partners more flexibility in seeking future mates (Oppenheimer 1994, p. 308). This aspect is of greater importance when the match between partners is low or when partners practice an egalitarian division of labor and are not economically dependent on one other. This argument will be further elaborated in Section 2.1 below. A further assumption that is drawn from the economic perspective on marriage is that marriage will be avoided in uncertain economic circumstances (Mills and Blossfeld 2005), and that when fathers are not able to fulfill the breadwinner role (Wilson 1987) marriage becomes less attractive as it does not provide any insurance to mothers.

Another defining feature of marriage emphasized by Cherlin (2000) is that it is a public commitment of partners to one another and thus brings with it a higher degree of enforceable trust. While this aspect might not appear overly relevant from a rational choice perspective it does emphasize that the costs and benefits of marriage are not only economic but also social. A number of authors argue that marriage itself has become a status symbol and a marker of adulthood (Cherlin 2004, Edin and Kefalas 2005). The idea that marriage itself is an achievement, one with a number of financial and social prerequisites that not all can meet, is an idea commonly employed to explain the negative association between education and childbearing outside of marriage (Perelli-Harris et. al 2010).

I propose that there exist both economic and social factors which influence the attractiveness of marriage relative to cohabitation. A further core assumption of this thesis is that parents' decision making is strongly dependent on the spatial and temporal context. Boundary conditions such as laws and institutions, social norms, and the overall economy shape individuals' moral beliefs, their perception of institutions, of what is right and wrong, and influence their planning for the future. Some of these factors may directly affect decision making by increasing the social cost of non-marriage, while others might affect the relative bargaining position of parents by influencing the division of labor in families.

I propose that norms regarding marriage likely have a direct effect on the decision to have a child in a marital or cohabiting union. When marriage is considered a normative institution, the social cost of having a child outside of marriage can override economic considerations. Specifically, if childbearing outside of marriage is highly stigmatized, non-marriage is associated with considerable social costs so that it essentially becomes a non-option.

Other macro-level factors influence partners' decision making in a more indirect manner by altering the division of labor in families and subsequently altering the parameters of marital bargaining. Specifically I assume that the organization of the welfare state heavily mediates mothers' role in the labor market (Esping-Andersen 1990; Esping-Andersen 1999). In the socialist welfare states of Northern Europe, in which mothers are considered an integral part of the labor force, their bargaining position relative to their partners is far better than in the familialistic welfare states of Southern Europe. These regimes plan for mothers to primarily take on the role of homemakers.

Most of the theories referred to below were developed with specific contexts, usually single countries, in mind and tend to formulate arguments which emphasize changes over time. Be it in the labor market, the inner-familial division of labor or in norms, values or institutions. While part of my analysis in Chapter 4, namely the time-series cross-section regression, will explicitly consider variation over time, the analytical focus of this study is placed on the comparison of countries. Instead of analyzing variation over time in a single context, variation between contexts is employed to test hypotheses.

Many of the theories drawn upon here are not specific to marriage decisions given (planned) childbirth, but instead are either intended to explain changes in marriage behavior or timing. Thus, I will attempt to outline why I believe them to be applicable to my research question. For those hypotheses intended to explain marriage behavior I examine whether their assumptions are applicable to a situation with children and how children might alter decision making processes.

2.1 Economic Independence

The starting point for any discussion of marriage behavior is generally the New Home Economics. In his 1973 article "A Theory of Marriage: Part I," Becker lays out the basics of a rational choice model of marriage which is further developed and expanded to other family processes in his *Treatise on the Family* which was released in 1980 and revised and expanded in 1991. This school of thought brings to the fore the idea that family processes

such as marriage and fertility can be thought of as a strictly utilitarian, rational decision making process. In the thinking of the New Home Economics, men and women are seen as trading partners who choose to marry when the gains from marriage are higher than the utility of staying single for both partners.

According to Becker, gains from marriage are the result of specialization. The Theory of Comparative Advantage (Becker 1991, p. 32) posits that the optimal division of labor within households entails specialization of partners on household and market activities. According to Becker, specialization is achieved by investing human capital in market or household related activities. Becker (1991, p. 44) argues that biological differences in childbearing and rearing have led women to invest more human capital in home related activities and men to specialize on market work. These biological differences are then reinforced by gender specific primary socialization (Becker refers to this as "specialized investment" 1991, p. 40), which results in the general pattern of a gendered division of labor.[5] For Becker the specialization on gender specific roles and the subsequent dependencies, which are greater for women, mandated the establishment of formal marriage contracts (p. 43 ff.).

In order to explain changes in marital behavior in the latter half of the twentieth century, Becker argues that gains to marriage decrease as women's earning power increases; this in turn leads to rising labor force participation. Subsequently, a higher number of children become less attractive, as they would take away from women's time in the labor force. The combination of these factors leads to a reduction in the gains to a gendered division of labor (Becker 1991, p. 350 ff.). Becker sees this development as responsible for the declining popularity of marriage. As indicators for this decline, Becker cites the increase in consensual unions, increases in families headed by women, and increases in illegitimate births (p. 55).

While this argument is often referred to as the "independence hypothesis," the term was actually not coined by Becker. Ross, Sawhill and MacIntosh (1975) were the first to propose an independence effect of women's earnings in a study on female headed households. Within sociology a study by Hannan, Tuma and Groeneveld (1977) is among the first to argue for such an independence effect of women's earning on the likelihood of divorce. Oppenheimer, while generally skeptical of Becker's ideas, acknowledges the importance of economic independence (albeit not for all couples) when she argues that "...greater independence allows women to set a higher standard for the minimally acceptable match - that is they need not be forced to settle for a poor-quality match or to remain in it despite considerable unhappiness" (Oppenheimer 1988, p. 587).

According to Becker changes in marriage patterns can be explained primarily through changes in women's role in society. Other authors argue that it is not so much women's increasing economic involvement but much rather men's changed economic position. Among the first to prominently voice such arguments was Wilson (1987) who sought to explain changes in black family structures in the 1970s in the United States. Wilson opposes the idea that the drastic increase in female headed black families is mainly due to the effects of welfare, as originally hypothesized by Becker (Becker, Landes and Michael 1977). Wilson argues that the magnitude of such a welfare effect has been grossly overestimated, and that one must also consider changes in black men's labor market position.

5 Becker uses the term 'sexual division of labor.'

He observed that increases in female headed households among the black urban population are likely attributable to a lack of marriageable men, where marriageable is defined as being gainfully employed. This argument not only addressed the labor market position of men but also the unbalanced sex ratios among urban black populations, a product of young black men's high incarceration and mortality rates. While Wilson criticizes Becker's conclusions, his argument very much relies on the foundations established by Becker (Ellwood and Jencks 2004). For this study, Wilson's work is important for two reasons: one, he applies Becker's arguments to non-marital fertility (albeit his focus is placed on single mothers rather than cohabiters); and two, his argument emphasized the importance of fathers' economic position.

In its core formulation, the independence hypothesis assumes that with increasing labor market specific capital women will more often forego marriage in favor of market work. However, this study applies this rationale to parents' decision to marry or cohabit at time point of childbirth. To do so, I will first discuss the defining differences between marriage and cohabitation and consider how children affect this decision making process. A fact that one must keep in mind, is that in Becker's thinking marriage and childbearing are seen as tightly interrelated (Gibson-Davis 2008). This implies that in its original meaning, the independence hypothesis is intended to distinguish between 1) remaining single and childless or 2) marrying and having children. In order for the independence assumption to also apply to 1a) living in cohabitation with children or 2) marrying and having children, there must exist qualitative differences between these two options. While no part of Becker's analysis specifically considers cohabitation (Cherlin 2000, p. 127) Becker does cite it as an indicator for the declining gains to marriage in the United States (Becker 1991, p. 55 and p. 354). In his discussion of welfare effects on single motherhood, he describes the decision to remain single versus marry for women as dependent on the comparison of income when single relative to income when married (Becker 1991, p. 16). However, this argument is only applied to distinguish between the decision to marry or to have a child as a single mother.

In his original "A Theory of Marriage: Part I" from 1973 Becker defines marriage as a shared household and explicitly includes consensual and casual unions in this definition (Becker 1973, p. 820). From this perspective, it could be argued that there is no difference between cohabitation and marriage, as both rely on a specialized division of labor in order to maximize utility. According to this logic, the independence hypothesis should not be applicable to such a comparison. However, in the *Treatise on the Family* such a definition of marriage is missing, which might be due to the fact in this book, Becker gives more thought to the question of why marriage requires contractual underpinnings in the first place. Here Becker highlights dependency, particularly that of women:

> *"...marriage law and contracts have mainly protected domestically specialized women against divorce, abandonment and other unfair treatment."* (Becker 1991, p. 44)

Thus, while Becker does not explicitly consider the merits of cohabitation versus those of marriage, the added benefit of marriage, i.e. the contractual nature, is nicely summarized in the above quote. The advantages of a marital over a cohabiting union can be summarized as follows: The contractual nature of marriage grants both partners a higher degree

of protection from abandonment. This is relevant for both partners. Assuming a gendered division of labor, as Becker does, women are dependent on men for earnings, as they a) spend time in the home with children, and b) have invested the majority of their human capital resources on the home, and thus lack labor market specific human capital. Men, on the other hand, have an interest in protecting 'marital-specific' capital, first and foremost access to their children.

Regarding the disadvantages of a marital union, Becker's analysis of divorce provides indication. The quote below nicely summarizes these:

> *"If they could search as "cheaply" for other mates when married as when single, and if marriages could be terminated without significant cost, they would marry the first reasonable mate encountered, knowing they would gain from even a less-than-optimal marriage*." (Becker 1991, p. 325)

Again an emphasis is placed on the contractual nature of marriage. The dissolution of marital unions comes with considerable cost. Thus once within a marital union, searching for other potential mates becomes more difficult. In comparison to cohabitation, marriage also reduces future possibilities on the partner market. This aspect is especially relevant if the fit of a match is low.

The main conclusion to be drawn from Becker's writing is that the contractual nature is the major difference between marriage and cohabitation. Analytically it is not a great leap to subsume that those women, who are not domestically specialized, i.e. less dependent on their partner for earning a living, might choose to forgo such a contractual agreement in favor of a cohabiting union. Cherlin (2000) similarly emphasizes the contractual nature of marriage but argues that a marriage contract is not only a legal agreement but also a public commitment of partners which comes with much tighter social control than a cohabiting union. Within the literature on union dissolution, Brines and Joyner (1999) put forth the argument that marriage and cohabitation follow different principles of organization, and that these principles are also chiefly responsible for the stability of unions. They argue that marriage contracts ensure partners against the risks of specialization. In cohabiting unions, there is no such insurance and thus a more egalitarian division of labor and power strengthens such unions.

In my view the question of whether the independence argument is applicable to a situation with children is dependent on whether children fundamentally alter the division of labor within families. In Becker's thinking this is clearly the case, as he sees children as commodities produced in families in which parents invest both time and money (Becker 1991, 24). This argument is at the core of his Theory of Comparative Advantage. In the thinking of Becker' the presence of children requires specialization. Since household specific tasks, i.e. the care of children, require considerable time and resource investments. Oppenheimer opposes Becker's assumption that specialization will always be the most optimal division of labor in families. Oppenheimer (1994, 1997) argues that particularly for women, specialization brings with it considerable risks, as household specific capital is not as easily transferable as is market specific capital; as a result, specialization increases dependency (1994). She argues further that specialization makes families vulnerable to external shocks such as the loss of an individual or loss of a job and is thus a very inflex-

ible strategy (Oppenheimer 1994). Oppenheimer is of the opinion that women's economic independence does not reduced the gains to marriage in general but only the gains to those marriages not characterized by a traditional division of labor. She argues that greater independence allows women to set a minimum standard for suitable matches and to terminate poor matches (Oppenheimer 1988, p. 587). Oppenheimer's stance is similar to that of Cherlin who emphasizes the role of women's economic resources for the bargaining processes between partners (Cherlin 2000). The realization that an efficient division of labor between partners must not always be one of specialized gender roles is central to this study, as it is my objective to examine the marriage status of young parents in a wide range of social contexts. Furthermore, I assume that the effect of independence will vary in magnitude between contexts.

Specifically I argue that if the care of children can be "outsourced," specialization as envisioned by Becker is no longer necessary. Given the fact that in many states in Europe such an outsourcing process has already been taking place over the last several decades, I propose that the economic independence argument is applicable here if mothers are not forced into specialized gender roles. This argument is similar to that put forth by Oppenheimer (1988) and Cherlin (2000), who criticize Becker for his assumption that specialization is always the most efficient division of labor in families. To this aim I will consider the theory of the welfare state and the feminist criticism thereof, in an attempt to identify factors which aid mothers' integration into the labor market and thus their economic independence.

2.2 The Welfare States and Reconciliation of Work and Family Life

With his seminal work on the *Three Worlds of Welfare Capitalism*, Esping-Andersen (1990) sparked a major discussion on welfare regimes, their classification and their impact on social policy. A key aspect of his work is the classification of ideal types of welfare state regimes which have since been heavily discussed, criticized (for an overview see Arts and Gelissen 2002) and remodeled (Esping-Andersen 1999). Esping-Andersen identified three regime types which are closely associated with predominant political ideologies: social democratic, conservative and liberal.

Esping-Andersen sees three historical processes as responsible for the development of welfare states: mobilization of the working class, class-political coalition structures, particularly during the transition from agrarian to industrial society, and the legacy of regime institutionalization, i.e. path dependency (Esping-Andersen 1990, p. 32). Esping-Andersen classifies welfare state regimes on the basis of two key concepts: de-commodification and stratification. De-commodification is defined as the degree to which individuals can maintain a living without relying on the (labor) market. Esping-Andersen sees welfare states as key players in defining the social stratification of society via the social policy it implements and which groups are targeted.

Welfare states play a massive role in shaping the division of labor between the sexes. Factors such as the availability of publicly funded child care, parental leave policies and taxation schemes can heavily weigh into partners' decisions on how to divide tasks, which in turn mediates women's dependence on their spouse. Furthermore, some theorists argue

that welfare state arrangements are complexly interrelated with culture (Pfau-Effinger 2005) and thus influence values and attitudes, an idea that is mirrored in modernization theories, which postulate that socioeconomic changes go hand in hand with changes in values and institutions (Inglehart and Welzel 2005).

While initially Esping-Andersen had disregarded families in his typology of welfare regimes, the concept of de-familalization was incorporated into his work in response to feminist criticism (Ostner and Lewis 1995, Orloff 1996) which argues that his work fails to account for the division of labor between the sexes in the household. In response to this criticism, Esping-Andersen reformulated his theory (1999) and introduced the concept of de-familalization. Familialistic welfare regimes are defined as regimes which rely on families for social insurance of its members. They are characterized by a void of active family policy or by policies which aim to reinforce the male breadwinner model by incentivizing female care responsibilities or disincentivizing female labor force participation (Leitner 2003). According to Esping-Andersen, de-familialization is a precondition for women (particularly mothers) to commodify themselves, i.e. offer their labor force on the market. Thus in a de-familized system women are not reliant on the earnings of their partners; they become more autonomous and can set up independent households. This argument has a certain similarity to the economic independence hypothesis discussed above. However, instead of emphasizing individual human capital, it emphasizes the role of boundary conditions.

The term de-familalization was initially introduced in feminist welfare discourse and defined as "the degree to which individuals can uphold a socially acceptable standard of living independently of family relationships, either through paid work or social security provision" (Lister 1994, p. 37). Feminist researchers argue that this original definition implies that women should not be dependent on the male bread winner (Kershaw 2010). Esping-Andersens' definition of de-familalization as "the degree to which households' welfare and caring responsibilities are relaxed - either via welfare state provision, or via market provision" (Esping-Andersen 1999, p. 51) focuses on households and thus disregards this dimension. A further interesting point emphasized by feminist researchers is that public policies must be de-gendered, i.e. they should not only unburden families of care responsibilities, but also ensure that mothers and fathers share equally in these responsibilities (Kershaw 2010, Saxonberg 2013).

In previous studies, four dimensions of social policy with which welfare states can attempt to de-familize are identified: leave policies, taxation schemes, cash benefits for families, and child care provision (Kershaw 2010). Leave schemes which grant extended periods of leave to mothers but none or little to fathers do little for promoting gender equality in regards to caring responsibilities and inhibit women's reintegration into the labor market. Similarly, taxation schemes and benefits that incentivize dual earner families will be more likely to promote an equal division of labor. The most important aspect of social policy for promoting female independence likely is the provision of child care services. For one, when child care is not available, this has a longer term effect on women's labor market reintegration. While leave schemes might provide mothers' income for up to a year in most European countries, thus disincentivizing labor market reintegration, the unavailability of full-time child care can inhibit mothers from working until children have reached school age. And while taxation and leave schemes can provide disincen-

tives to mothers' labor market participation, a lack of child care can make it impossible. The literature on the "family gap" (for an overview see Waldfogel 1998) emphasizes that motherhood leave reduces women's earnings potential and that this effect increases with the duration of leave (Dex et al. 1998, Ejrnæs and Kunze 2013). In the European context child care for the age groups 3 to 6 is warranted in most countries, but considerable variation in availability of child care for children under 3 years of age can be observed between the countries of the European Union (Mills et al. 2014). A further aspect to consider is the cost of child care. Esping-Andersen (1999) argues that it is important to consider both state and market based care provision. Esping-Andersen argues that market based care is of great importance in liberal welfare regimes. Leitner (2003) argues that market driven care provision makes de-familialization an issue of social class, as not all can afford care services provided by markets. Similarly, Saxonberg (2013) argues that market based care solutions will do little to create equality between men and women as they reinforce gender roles. In situations where care becomes unaffordable, women are more likely to stay at home, because of the gender pay gap and existing social norms. Meyers, Gornick and Ross (1999) echo these arguments when they conceptualize costs of child care as a special tax on mothers' earnings.

As mentioned above I see the concept of de-familalization as a useful tool for linking the micro-level mechanism of female independence with country level boundary conditions. The arguments proposed by Esping-Andersen and by feminist theorists emphasize that de-familialization empowers mothers to participate in the labor market. Among the policies discussed here, I see child care provision as central to ensuring the compatibility of work and family life for mothers. As a result, I argue that in contexts with greater availability of child care a more pronounced independence effect of mothers' labor market specific resources should be observed. However, the economic independence of mothers from their partner is likely only ensured when they can earn a living on their own. In situations where the care of young children does not need to be provided by the mother, she can return to work after pregnancy quickly and thus reduce the loss of earnings potential that is commonly associated with leaves due to childbirth. Thus, availability of child care influences decision making in two ways: on the one hand, by ensuring independent earnings in the short term; and on the other hand, in the long-term by preventing a drop off in future earnings potential.

I hope to have shown that the basic logic of the new home economics is equally applicable to the decision to marry or cohabit at time point of childbirth when compatibility of work and family life is ensured and argue that independence effects should be strongly dependent on context.

Economic Independence Hypothesis

The better the labor market position of mothers, the lower the likelihood that parents are married at the time of a child's birth. This effect is expected to be more pronounced in contexts in which it is easier to combine work and family life.

2.3 Status Attainment

In American sociology, the changing cultural significance of marriage has been a hotly discussed topic over the last decades. While this discussion is very focused on the American context, the core arguments are structural in nature and thus should be applicable to Europe as well. At the heart of this argument, which was initially introduced to the discussion by Cherlin (2000, 2004), is a cultural redefinition of marriage. Cherlin (2004, p. 855) argues that as marriage's practical significance as a social institution declines, its symbolic importance increases. He argues that marriage today functions as a status symbol and as a marker of accepting adult social roles (Cherlin 2000, p. 137; Cherlin 2004, p. 855).

In their 2005 book *Promises I Can Keep*, Edin and Kefalas build on the arguments proposed by Cherlin and apply them to non-marital fertility. Their qualitative study on lower class single mothers from poor inner city neighborhoods attempts to understand young mothers' motives for having children outside of marriage. The core mechanism identified by Edin and Kefalas (2005, p. 200 ff.) is one influenced by social structure and attitudinal change, what they term the redefinition of marriage.

The baseline of this argument is that attitudes towards marriage and non-marital childbearing in the U.S. have become more liberal, which in turn leads to a reduction in the social pressure to legitimize a non-marital conception. They emphasize that the benefits which used to be exclusive to marriage, such as a shared household, sex and the raising of children, are now no longer tied to marriage. If marriage becomes less common and in a sense more special, it is open to reinterpretation. The common cultural ideal that establishing an own(ed) home is a prerequisite of marriage is often perceived as a barrier to marriage (Gibson-Davis, Edin and McLanahan 2005). However, such cultural ideals are hard to be reached by lower class women in the U.S. (Edin and Kefalas 2005, 202 ff.). Children, however, are of great importance and can be had early in life as the opportunity costs of children weigh far less on lower class women, who rarely have access to higher education (46ff.). In Edin and Kefalas' opinion, the decision to have a child is not so much one of economic consideration but rather a process of creating meaning for one's own life.

Thus the disconnection between marriage and childbearing is seen as a product of the disparate economic preconditions of these two processes (Gibson-Davis 2009, p. 146). In contrast to both Becker and Oppenheimer, this school of thought is specifically concerned with the phenomenon of non-marital fertility and explicitly acknowledges that marriage and fertility decisions are independent of each other (Gibson-Davis 2008). While this approach assumes that economic prerequisites to marriage exist, such prerequisites do not exist for cohabiting unions – or at least to a much lesser extent (Clarkberg 1999; Oppenheimer 2003; or for a European example Kravdal 1999). In a similar vein, Smock, Manning and Porter (2005) emphasize that the transition from cohabitation to marriage is dependent on attaining a certain financial status. They insist that the discourse on financial prerequisites to marriage should not only be limited to the lower classes. Most quantitative empirical research building on this school of thought is intent on measuring the effect of wealth (Schneider 2011; Schneider 2012) or earnings (Gibson-Davis 2009) on marriage.

Proponents of this school of thought make it very clear that their arguments relate specifically to the U.S. American case, as attitudes, and specifically the social construction of the institution of marriage, play an important role in this theory. As marriage is more

widespread in the U.S. today than it is in most European countries, it is an interesting question whether the predictions of this school of thought are applicable to the European context. In particular, I wish to test whether the assumption that as marriage becomes less of a normative institution, parents with higher social status will actually be more likely relative to parents with low social status to have a child in a marital union, can be confirmed. In this study, I can only explore value changes over time to a limited extent. However, there is considerable variation in regards to the normative imperative to have a child in a marital union, and in the acceptability of alternatives throughout Europe. Thus I will attempt to test whether the degree to which social status predicts parents' marital status at the time of childbirth varies between countries. I hypothesize that in contexts in which alternatives to marriage are less accepted, parents will be married regardless of social status, while in more tolerant contexts I expect a more pronounced effect of social status on parents' likelihood to be married when a child is born.

Recent demographic research finds strong evidence for a negative association between non-marital fertility and women's education throughout Europe (McLanhan 2004; Perelli-Harris et al. 2010); findings which confirm to the status attainment hypothesis if one sees education as a measure of social status. An analysis by Kalmijn (2013) for 25 European countries, which examines marital status of middle aged men and women, finds a positive association between marriage and education and that this association is very much context dependent. However, until now no studies exist which have attempted to contextualize such an effect when studying non-marital fertility. This study will attempt to test the effect of a number of measures of social status and examine whether their effect is indeed contextual.

Status Attainment Hypothesis

The higher the social status of parents the higher the likelihood that parents are married at the time of birth. This effect is expected to be more pronounced in contexts with higher acceptance of alternative family forms.

2.4 Independence versus Status Attainment

The observant reader might have already noticed that the predictions of the independence and the status attainment hypotheses are somewhat at odds. I follow Oppenheimer (1994, p. 315) in postulating that women's socioeconomic resources likely have both positive and negative effects on marital behavior, and am not the first to do so (Ross, Sawhill and MacIntosh 1977; Ono 2003; Harknett and Kuperberg 2011). On the one hand, the economic independence hypothesis predicts that as mothers' labor market relevant resources increase, so does their economic independence. This in turn increases the likelihood that a woman prefers to live in cohabitation instead of marriage at the time of childbirth. The status attainment hypothesis, on the other hand, posits that social status should be associated with a higher likelihood of having a child in a marital union.

Although the concepts of labor market relevant resources and social status are not congruent there is considerable overlap. Specifically, education serves as an important measure for both concepts, which will likely make the interpretation of results a bit more

challenging. However, the proposed research design will attempt to account for this. By considering socioeconomic characteristics of both mother and father, I will be able to compare the effects of mothers' characteristics relative to fathers'. This is useful, as the postulated independence effect should only be visible for mothers, while the status attainment effect is expected for both fathers and mothers. Furthermore, a comparison of results for different countries will allow me to examine the contextual nature of these effects.

2.5 Uncertainty

One of the key arguments proposed by Oppenheimer (1988) is that marriage decisions are not only influenced by the current economic situation but also by future economic prospects of potential spouses. Oppenheimer emphasizes the importance of uncertainty in regards to one's own and one's partners' future economic situation, the idea being that if one's economic wellbeing is uncertain, long-term investments become less desirable. Mills and Blossfeld (2005) apply this argument to other demographic and social changes and argue that, in light of globalization, the role of uncertainty in young people's lives has become ever more important. I will now briefly summarize the work of Oppenheimer and her argument on how insecurity affects marriage. Then I will examine the arguments put forth by Mills and Blossfeld in more detail and consider whether and how they can be applied to the decision to live in marriage or cohabitation at the time of childbirth.

In her pioneering 1988 article, "A Theory of Marriage Timing," Oppenheimer questions the validity of Becker's independence hypothesis by arguing that changes in family formation in the U.S. can be better explained by changes in marriage timing than by increases in non-marriage. Oppenheimer applies job search theory to marriage markets and introduces the concept of imperfect information about partners' future earnings potential. Oppenheimer's core argument is that transitions to marriage are dependent on transitions to "adult economic roles" (Oppenheimer 1988, p. 565) which she sees as a prerequisite to set up an independent household. She observes that the deterioration of young men's economic position, in particular, delayed career entry, is responsible for increases in age at first marriage for both men and women. Furthermore, she emphasizes that as married women's labor market participation increases, partners are more likely to mate assortatively as women's labor market characteristics gain relevance for family welfare. If married women are involved in the labor market, lifelong matching processes have to consider this, and post marital adaption (i.e. specialization on housework) is less beneficial, so that assortative mating becomes more desirable. And since assortative mating requires more information, marriage decisions are delayed due to uncertainty regarding a partner's future economic prospects. In such situations Oppenheimer (1988, p. 583) sees cohabitation as a substitute for marriage, allowing partners to benefit from economies of scale and to enjoy a sexual relationship while not yet fully committing to a partner whose future value as a mate remains uncertain.

A fairly recent large scale research project, headed by Hans-Peter Blossfeld, examines how globalization and the subsequent economic changes have affected the transition to adulthood in industrialized nations. The assumption is that with globalization come unprecedented levels of structural insecurity which affect young people's decision making in

regards to employment, partnership and parenting. Institutional filters, such as the employment and education system, the welfare regime and families moderate the effect of macro-level insecurity on individuals. Following arguments by Breen (1997), Mills and Blossfeld (2005) argue that uncertainty will lead young people to avoid long-term binding commitments by favoring cohabitation over marriage or foregoing or delaying childbearing.

While Mills and Blossfeld cite changes in family formation behavior as possible consequences of increased planning insecurity, they do not specifically address childbearing outside of marriage. And it is questionable whether non-marital fertility can actually be explained via the mechanism of planning insecurity. Non-marital fertility, as discussed above, includes two different decisions: having a child and whether or not to marry. If both of these decisions are equally affected by uncertainty, no net effect of uncertainty on non-marital fertility should be observed. Mills and Blossfeld make no statements in regards to non-marital fertility; nor is childbearing in cohabitation an issue touched upon in the work of Oppenheimer. Much like Becker, she seems to see marriage and childbearing as tightly interrelated processes (Gibson-Davis 2008) and argues that cohabitation functions primarily as a testing stage and a prelude to marriage which will eventually be converted at a "critical life transition – for example the desire to have a child" (Oppenheimer 1994, p. 308).

However, as discussed above, Edin and Kefalas (2005) and Gibson-Davis (2009) argue that the economic prerequisites of marriage and childbearing are not identical. These authors emphasize that the decision to have a child is often not motivated by economic factors, but instead by women's desire to create meaning in their life. Based on this logic I assume that the uncertainty argument should be applicable to childbearing outside marriage.

One difference between the arguments proposed by Oppenheimer and Mills and Blossfeld is that while Oppenheimer considers uncertainty mainly at the individual level, Mills and Blossfeld also emphasize how macro conditions such as high unemployment rates affect young people's family decisions. The concepts of labor market and job insecurity can help to better understand this distinction. Labor market insecurity refers to insecurity which arises from difficulties in finding a new job when jobless, whereas job insecurity refers to the perceived potential of job loss (Dixon, Fullerton and Robertson 2013). The prime macro-level indicator for both types of insecurity is the unemployment rate, as it reduces worker's bargaining power (Silver 2003). In order to test these two dimensions of uncertainty, I will attempt to examine both direct effects, operationalized via individual's economic situation, as well as indirect effects, via the overall labor market situation within society. For the research at hand, the unemployment rate is a logical choice to test the macro effect of uncertainty as it can be employed both within the time-series cross-section and multilevel analysis. At the micro-level I will be examining employment characteristics. Following the assumption of Mills and Blossfeld (2005, p. 19), which are very much in line with the ideas of Becker (1991) and Wilson (1987), I expect that a more pronounced effect of economic insecurity can be observed for fathers.

Uncertainty Hypothesis

Insecure labor market situations reduce the likelihood of parents to be married at the time of birth. I expect to observe both an indirect effect of uncertainty at the country level and

a direct effect at the individual level. I assume that the effect at the individual level should be more pronounced for fathers than for mothers.

2.6 Normative Backing of Marriage

An idea touched upon in the section on status attainment is that not only have the socio-economic underpinnings of marriage changed, but the institution of marriage itself has changed as well. Thus the meaning of marriage might differ between contexts. Furthermore, marriage might carry varying levels of importance as a social institution in different contexts. The degree to which having a child within a marital union is seen as imperative, i.e. marriage is seen as a mechanism of social control (Tyrell 1988), should affect parents decision making on whether or not to be married when a child is born. The idea I wish to put forward is that non-marital fertility is strongly dependent on the normative backing of marriage. I argue that in contexts in which the birth of a child outside of marriage is conceived of as sacrilege or comes attached with social stigma, a non-marital birth involves considerable social costs for parents. The quote below from Inglehart and Welzel sums up this mechanism far more eloquently than I could ever hope to:

> "*Norms that can constrain people's behavior, even when it is in their rational interest to do something else, are norms that are taught as absolute rules...*" (Inglehart and Welzel 2005, p. 34)

As the above quote points out norms can override a strictly utilitarian decision making process if they carry enough weight to be considered rules. Such a process of institutionalization can be reinforced through an individual's own conscience and beliefs, family and peer networks or social institutions.[6] By the same token, the influence of such norms on individual behavior can decrease over time if the social fabric that shaped them changes or the institutions backing them loose significance in peoples' everyday lives.

Such arguments are brought forward by proponents of the deinstitutionalization of marriage school of thought (Tyrell 1988; Cherlin 2004), who cite the declining significance of marriage. In this context, deinstitutionalization is understood as a "weakening of social norms that define people's behavior in a social institution such as marriage" (Cherlin 2004, p. 848). Particularly during the "golden age of marriage" in the middle of the 20th century the nuclear family and universal and early marriage established itself as the ideal in most parts of Europe (Huinink and Konietzka 2007, p. 70). Tyrell (1988) argues that the institution of the „bürgerliche Ehe" (breadwinner family) encompasses far more than just a contract between two individuals but that it is a package deal, held together by social control, laws and norms, which included sex, companionship, love and a place for childbearing.[7]

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6 Here I refer to Ajzen's theory of planned behavior (1991), which posits that normative belief (the degree of disapproval of an action by reference groups) and one's own motivation to comply affect decision making processes.

7 Compare also Cherlin (2004, p. 851ff.) who in reference to Burgess and Locke (1945) argues that marriage during the middle of the 20th century was not only characterized by a sharp division of labor between partners, but also by companionship.

Through strong social norms, this package deal had a monopoly position during the golden age of marriage which it has lost as new forms of partnership have arisen.

The second demographic transition framework ascribes a central role to new contraceptive techniques such as the pill (Van de Kaa 1987). These technological advances allow for the separation of sexual intercourse and child bearing, which in turn undermines marriage's monopoly as the place for intimate relationships. Van de Kaa (1987) calls this a paradoxical relationship and argues that the availability of contraception has led to changes in norms regarding sexual behavior that allow couples to live together unmarried. Within cohabiting unions, couples are then free to plan fertility and, after conception, decide whether they want to marry or not.

Cherlin (2004) provides a similar interpretation of the process of deinstitutionalization of marriage. In his view, it is the rise of individualized marriage (p. 852) which is characterized by self-fulfillment of partners and more flexible roles, weakens the position of marriage as a social institution. He cites theories of individualization such as those by Beck (Beck and Beck-Gernsheim 2002) and Giddens (1992), which emphasize an overall decline in the power of norms and institutions.

Hartmut Esser (2002) raises an interesting point in his argument on the framing of marriage. Esser's theory of frame selection assumes that frames are selected in order to define situations, and these frames dictate which patterns will guide our actions. Essentially this construct is used to introduce normative behavior into rational choice theory.[8] With respect to marriage, Esser (2002) argues that different cultural models of marriage exist, with which actors associate expectations, norms and utility. The "traditional" model of marriage is that of sacrament (Witte 1997), while all alternatives are less unconditional and are thus less institutionalized (Esser 2002, p. 37 ff.). His argument can serve as the micro-macro link in describing the deinstitutionalization of marriage. Esser's argument also emphasizes the role of the church as the institution which upholds the model of marriage as sacrament. Similarly, Tyrell (1993) sees the deinstitutionalization of marriage as going hand in hand with the declining significance of Christian churches. Wilcox (2008) argues that churches serve to uphold the institution of marriage; not only do they provide a moral backing, but they also support behavioral patterns which help to stabilize marriage. In his view, this is achieved primarily through participation in religious ceremonies.[9]

To sum up, these approaches argue that marriage as an institution has been weakened by a loss of function, via the evolution of marriage away from the male breadwinner ideal, changing norms and decreasing backing by institutions such as the church. What is less clear is whether it is increases in cohabitation and childbearing outside of marriage that cause the deinstitutionalization of marriage or vice versa (Bachrach, Hidin and Thomson 2000). While some authors see the declining importance of marriage as a social institution grounded in changes in values, others see changes in the inner familial division of labor at the core of the process. Thus, the normative backing of marriage hypothesis can be seen as competing with the independence hypothesis. It will be interesting to examine how these explanations hold up alongside one another in multivariate analysis.

8 Compare Esser (1999, p. 333).

9 For further empirical evidence of this association see also Burdette, Haynes and Ellison (2012).

Normative Backing of Marriage Hypothesis

In contexts where the social support of marriage is higher parents are more likely to be married at the time point of childbirth.

2.7 Gender Equality

The normative backing of marriage hypothesis emphasizes the role of marriage norms and how they influence parents' decision making. A further approach which focuses on the importance of norms for parents' choice of family form is what I term the gender equality school of thought. Inglehart and Norris (2003) argue that a defining feature of societies is the degree of equality between the sexes, in particular men's and women's attitudes towards gender roles. This argument builds on modernization theory and assumes that changes in economic relations, laws, institutions and values progress along common paths. In this thinking changes in values drive this process and define how parents share responsibilities and whether they choose non-traditional family forms. In effect, this hypothesis can be seen as competing with the independence hypothesis, which emphasizes the division of labor in families and women's role in the economy. I will now briefly reiterate some of the core ideas of modernization theory, and discuss the arguments put forward by Inglehart and Norris, and how they relate to non-marital fertility.

Modernization is generally conceived of as societal change from agrarian society to industrial society to post-industrial society (Inglehart and Welzel 2005). While classic modernization theorists such as Marx, Weber or Durkheim focused on the shift from agrarian to industrial production regimes, the transition from industrial society to knowledge society has gained prominence in the latter part of the twentieth century (Bell 1973; Inglehart 1977). The transition to post-industrial economy is marked by the rise of service sector over manufacturing sector jobs (Bell 1973). Two major social structural changes are associated with the transition to knowledge society. On the one hand, service sector jobs require a higher level of skill from employees, thus increasing the societal level of education. On the other hand, the proportion of women in the labor force generally increases, improving women's social participation and opening up new opportunities for managerial positions (Inglehart and Norris 2003, p. 14). At the same time, the expansion of the welfare state in post-industrial societies also creates new employment opportunities for women (Esping-Andersen 1999, p. 152).

The post-materialist shift as theorized by Inglehart (1990; 1997) describes the intergenerational value changes observable as of the 1960ies in western societies. Central to this shift is a move away from survival towards self-expression values (Inglehart and Welzel 2005). As a consequence of this shifts individuals place greater emphasis on quality of life, equal rights and environmental concerns. Less attention is paid to basic aspects of survival and material goals as these are ensured by the welfare state. This societal transition also results in changes in family relations and a redefinition of gender roles. Inglehart and Norris (2003) argue that the move towards post-industrial society implies for its members a far higher degree of existential security, and thus the classic division of labor of men as breadwinners and women as caregivers loses its societal significance. As women's participation in the labor force increases, they receive more power and demands of women

for greater equality in the realm of the family become louder. In turn, society becomes more responsive to these demands due to the increasing value placed on self-expression values both among women and men. According to this logic, the idea of equality becomes increasingly important as societies modernize. Both women and men come to accept that the sexes should be treated as equals and seek to promote gender equality both in their individual relations as well as at the societal level. On the one hand, this leads to a rise in new forms of partnership (Ingelhart and Norris 2003, p. 14), and in the long run will also lead to changes in institutions. This change in gender roles in turn leads to a weakening of the position of the male bread winner family, both in regards to its economic practicality and it's cultural underpinnings; and in turn to the development of alternative forms of living. This argument is very similar to that proposed by Hoffmann-Nowotny (1996) who adds a system-theoretic argument. Internally the breadwinner family and unequal division of power are tested by changing norms, specifically those encouraging "equality." Once these values, which are imported into the family system through the cultural system, permeate the family a mismatch between families' structural mechanism and logic of action comes to the fore.

While the gender equality argument does consider economic factors, it focuses primarily on value changes. However, there is no clear statement on whether value changes precede economic changes or vice versa. Instead Inglehart and associates argue that values, economic factors and institutions are complexly interrelated. In contrast to the independence hypothesis, which sees economic independence as primarily responsible for women's changing role in society, the Gender Equality Hypothesis ascribes a central role to value changes when it comes to explaining the relationship between the sexes and the rise of new partnership forms and non-marital fertility.

Gender Equality Hypothesis

I assume that gender roles, measured as aggregated attitudes towards women's role in society and the labor force, should influence non-marital fertility and that in societies with more egalitarian gender roles parents should be less likely to be married at time point of childbirth. Such an effect should be observable independently of economic factors.

3 Non-Marital Fertility in Context

The intent of this chapter is to provide a frame of reference for the analyses presented in Chapter 4. By examining the development of non-marital fertility in Europe since the 1960s, detailing the different boundary conditions throughout Europe and providing an overview of existing research, I hope to offer a more detailed description and to situate my research within the current literature. Furthermore, examination of descriptive statistics and findings from previous research allows for a first tentative examination of the hypotheses presented in Chapter 2.

In Section 3.1, I will examine the development of non-marital fertility in Europe from 1960 to 2010 on the basis of country level data. The objective of Section 3.2 is to examine the social, economic and legal boundary conditions which might play into parents' decision to choose either marriage or cohabitation for childbearing. This analysis employs a wide range of data from legal databases, to official statistics, to social surveys, but is largely limited to a description of the current status quo and does not take a longitudinal perspective. Section 3.3 reviews existing research from Europe. While the focus of this literature review is placed on comparative research, it also examines a large number of single country studies.

3.1 Development of Non-Marital Fertility in Europe since 1960

In this section I present data on the development of rates of non-marital fertility (NMF), i.e. the proportion of live births to unmarried mothers, in Europe over the last 50 years. These data highlight the massive increase of non-marital fertility throughout Europe since the end of the "golden age of marriage" and the different patterns of development during this time. All analyses are based on country level official statistics on childbearing outside of marriage provided by Eurostat. These statistics are calculated on the basis of national birth registers by national statistical institutes and are available from 1960 onward. However, data are not available for the entire period for all countries, mainly for the former socialist countries of Eastern Europe. For a similar analysis which employs data at the level of regions and is more focused on spatial patterns in the development of non-marital fertility, see a recent working paper by Klüsener (2015).

This section seeks to highlight historical developments and examines different developmental trajectories and common patterns throughout Europe. The analysis strategy in this section entails two steps. First, I will provide a descriptive overview of the development of non-marital fertility over time throughout Europe. In a second step, I will analyze patterns within this development via descriptive and multivariate techniques.

3.1.1 Trends in Non-Marital Fertility Ratios in Europe

The development of non-marital fertility ratios across Europe over the last five decades has been somewhat diverse. In order to highlight common trends and regional and cultural differences, I have classified all countries being studied into 4 ad-hoc country groups. While this classification bears some semblance to the classification of welfare states by

Esping-Andersen (1990), it is mainly motivated by geographic and historical proximity. The selection of countries is mainly motivated by data availability. Specifically, since the EU-SILC serves as the basis for my micro-level analysis, and I wanted to achieve a certain amount of consistency between both parts of my analysis, the scope of the analysis is the European Economic Area (EEA). A few countries had to be omitted due to unavailability of microdata, such as Germany.[10] And thus I exclude these countries from the country level analysis as well.

The 27 countries are grouped into 4 regions. The group of Nordic countries consists of Denmark (DK), Sweden (SE), Finland (FI), Norway (NO) and Iceland (IS). The second group which I have titled Core Europe includes central European countries as well as the British Isles: Austria (AT), Belgium (BE), France (FR), Ireland (IE), the Netherlands (NL), Luxembourg (LU) and the United Kingdom (UK). The Southern European country group includes Italy (IT), Spain (ES), Portugal (PT), Cyprus (CY) and Greece (GR). The Eastern European country group includes the former socialist countries: Czech Republic (CZ), Estonia (EE), Hungary (HU), Latvia (LV), Lithuania (LT), Poland (PL), Romania (RO), Slovakia (SK) and Slovenia (SI).

In order to better understand the pace at which changes have progressed over the last five decades I calculated the Compound Annual Growth Rate (CAGR) as well as the absolute change (AC) in non-marital fertility for each country under study. I calculated the absolute change by subtracting the rate observed in the first year of each decade (e.g. 1960) from the value observed in the last year of each decade (e.g. 1969). The Compound Annual Growth Rate is calculated on the basis of the following formula:

$$CAGR= ((NMF(t_n) /NMF(t_0))^{(1/tn - t0)}-1)^{*}100$$

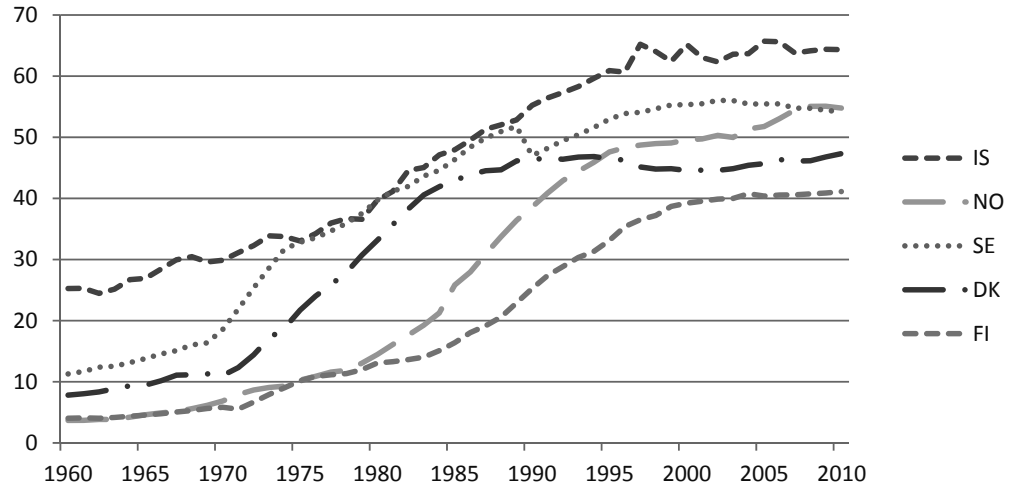
Essentially the CAGR can be interpreted as a smoothed yearly growth rate. The default for t_n is set to the last year of a decade while t_0 by default is set to the first year of the decade. In cases where data for the first year of a decade is not available t_0 can also refer to later years. This is the case for Romania in the '90s. Data on the Compound Annual Growth Rate and absolute increase by country and decade are included in Table 3.1. Additionally, I have plotted the development of non-marital fertility ratios from 1960 to 2010 by region in Graphs 3.1 through 3.4.

10 Germany is excluded from the analysis since the EU-SILC User Database does not distinguish between East and West Germany, due to overly rigid anonymization criteria.

Table 3.1 Changes in non-marital fertility by decade

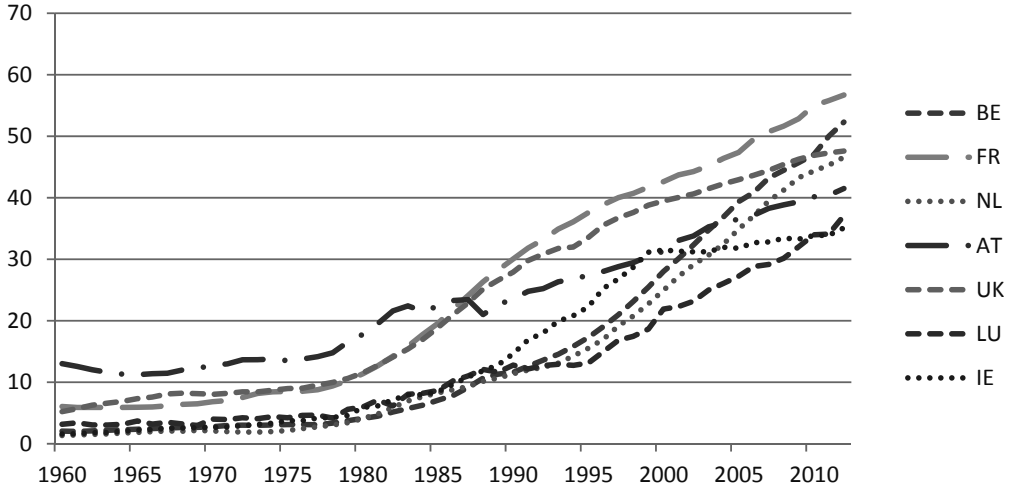
	1960s		1970s		1980s		1990s		2000s		NMF
	CAGR	AC	CAGR	AC	CAGR	AC	CAGR	AC	CAGR	AC	2010
DK	4.17	3.48	12.05	19.69	3.73	12.96	-0.37	-1.54	0.54	2.22	47.3
FI	3.77	1.60	8.34	6.16	6.43	9.84	4.86	13.45	0.46	1.67	41.1
IS	1.77	4.33	2.27	6.70	3.23	13.14	1.37	7.19	-0.14	-0.80	64.3
NO	5.87	2.47	7.41	6.19	10.79	21.92	2.71	10.50	1.17	5.49	54.8
SE	4.23	5.09	8.14	18.97	2.99	12.06	1.82	8.29	-0.19	-0.92	54.2
Nordic	3.94	3.38	7.63	11.52	5.43	13.98	2.08	7.60	0.37	1.54	
AT	-0.68	-0.77	2.92	3.77	2.71	4.84	2.91	6.94	2.58	8.05	40.1
BE	2.92	0.61	3.42	0.98	11.89	7.20	9.12	13.86	5.59	17.7	45.9
FR	0.78	0.44	4.65	3.45	10.62	16.85	3.72	11.69	2.42	10.25	54.1
IE	5.66	1.02	6.32	1.95	9.01	6.92	8.74	16.5	0.61	1.76	33.8
LU	-0.68	-0.19	3.76	1.58	7.70	5.67	4.29	5.87	4.32	10.16	34.0
NL	5.42	0.82	5.72	1.35	11.19	6.57	8.00	11.37	6.31	18.34	44.3
UK	5.07	2.93	3.15	2.59	9.74	15.08	3.72	10.89	1.78	6.81	46.9
Core	2.55	0.67	4.23	2.23	8.97	9.00	5.77	10.99	3.38	10.44	
CY			11.82	0.26	1.02	0.06	13.21	1.48	19.68	9.41	15.2
ES	-5.41	-0.91	8.35	1.44	10.11	5.42	6.05	6.69	7.66	16.73	35.5
GR	-1.13	-0.12	2.61	0.29	3.90	0.6	6.64	1.7	5.61	2.55	7.3
IT	-1.88	-0.38	6.80	1.76	3.95	1.79	4.04	2.77	8.30	10.13	21.5
PT	-2.84	-2.16	1.26	0.88	5.21	5.33	3.96	6.15	6.19	15.92	41.3
South	-2.80	-0.90	5.32	0.90	4.99	2.66	6.81	3.74	9.53	10.96	
CZ	1.32	0.61	-0.85	-0.4	3.86	2.28	10.26	12.04	6.64	17.06	40.3
EE							7.96	26.99	0.93	4.71	59.1
HU	-0.52	-0.25	2.22	1.19	6.33	5.26	8.75	14.82	3.86	11.78	40.1
LT			6.71	2.94	0.74	0.43	12.27	12.82	2.39	5.36	25.7
LV	-3.93	-3.62	0.79	0.84	2.71	3.4	9.77	22.18	0.83	3.13	44.4
PL			-0.58	-0.26	2.48	1.17	7.29	5.49	5.85	8.11	20.6
RO							5.97		1.03	2.47	27.7
SI	-0.70	-0.71	3.64	3.24	6.57	10.14	4.14	10.84	4.17	16.51	55.7
SK	3.09	1.47	-1.48	-0.78	2.55	1.46	9.24	9.25	6.27	13.31	33.0
East	0.06	-0.23	1.94	1.31	3.34	3.36	9.11	15.26	3.46	9.48	

The Nordic countries are very interesting, as they are among the countries with the highest levels of non-marital fertility throughout Europe over the last 50 years and exhibit a shared developmental trajectory. Common to all Nordic countries is that after an era of sharp increase, they reach an equilibrium in which there is little to no change in the non-marital fertility ratio over time. However, there are large differences in regards to when and at what level of non-marital fertility this equilibrium is achieved in the different Nordic countries. In Finland, the equilibrium was reached at the turn of the century at a non-marital fertility ratio of about 40%. Between 2000 and 2009, the rate increased by merely 1.67 percentage points, whereas in the 1980s and '90s it had increased by 23 percentage points in total. In Denmark, the sharp increase in the non-marital fertility ratio began much earlier, around 1970. In fact, the CAGR of 12.05% for the 1970s in Denmark is by far the largest rate of relative increase observed in any Nordic country. This rapid growth already began to slow in the 1980s, and the non-marital fertility ratio has remained fairly stable since the end of the decade. However, while the non-marital fertility ratio has not been as stable as in Finland, it has gravitated around roughly 45% for almost 25 years. The development in Sweden ran parallel to that in Denmark, albeit at a slightly higher level from the late sixties to the late eighties. As a matter of fact, the absolute increases in the proportion of non-marital births in the 1970s and '80s are almost identical to those in Denmark. However the equilibrium has not been as level as in other countries. After a short but sharp drop off in the non-marital fertility ratio in the late 1980s, a new period of slower growth began, which dropped off again around the turn of the century. More recently a slight decline in non-marital fertility can be observed. The development of non-marital fertility in Norway shows a very special pattern. After a very sharp increase between the early 1980s and the mid '90s (from 16 to 48% in the fifteen years from 1981 to 1996), the non-marital fertility ratio stabilized at about 50% around the turn of the century, only to jump by another 5% points in the noughties. Iceland is a completely different case when it comes to non-marital fertility. Historically, non-marital fertility in Iceland has been very high, a fact that is attributed to a persistence of pre-Christian ethics (Tomasson 1976). What it has in common with the 'other' Nordic countries, is that the proportion of non-marital births has remained consistently high at around 65% for the last 15 years. However, the non-marital fertility ratio was already at around 25% in the early '60s, and the rate of increase between then and the mid-nineties when the current equilibrium was reached is almost linear.



Graph 3.1 Non-marital fertility ratios in Northern Europe

Overall, this group of countries displays a common developmental pattern, reaching equilibrium in the non-marital fertility ratio within the last twenty years. Increases in non-marital fertility in Nordic countries were greatest in the 1970s and '80s, when the absolute change in the percentage of non-marital births was over 25 percentage points, but as of late this development has slowed to an almost complete halt with an average CAGR of merely .34% in the first decade of the new millennium. I do observe substantial differences in the levels of non-marital fertility (in 2010: Iceland 64%, Finland 41%). Thus while there might exist certain parallels in the developmental trajectories in these countries, there is also considerable heterogeneity in regards to levels of non-marital fertility within the Nordic countries.



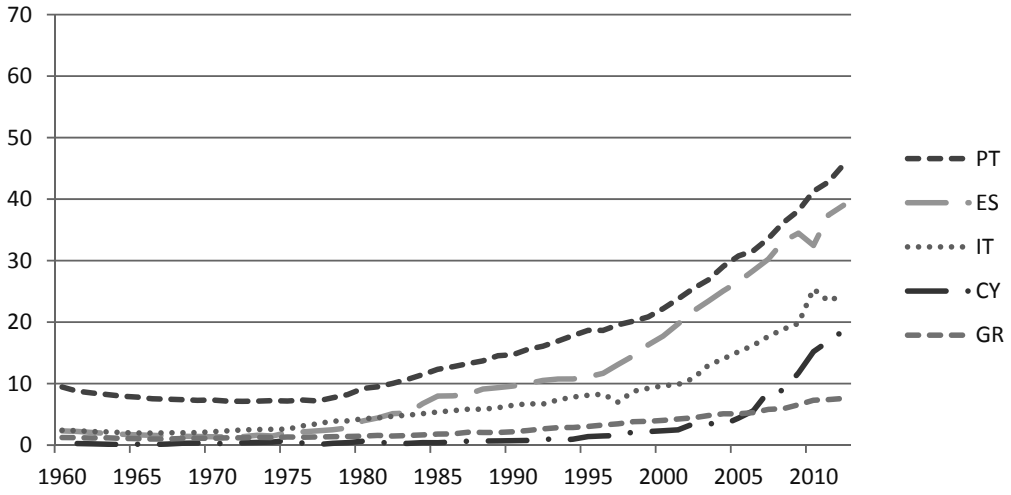
Graph 3.2 Non-marital fertility ratios in Core Europe

The group I have termed Core Europe, which contains central European countries along with the UK and Ireland, displays a rather homogenous development in non-marital fertility over the last 50 years (compare Graph 3.2). It is one of moderate but constant increase that in most cases began in the 1970s and persists to this day. Austria appears as a bit of an oddity due to its historically high rates of non-marital fertility, which are attributed to inheritance laws (Kytir and Münz 1986). Also the rates of increase in non-marital fertility over the last decades have been rather modest. Another remarkable trend can be observed in France and the UK, which show an almost completely parallel development in the non-marital fertility ratio until the end of the eighties, when France surpassed the UK. The Benelux countries all show very similar developments as well, with Luxembourg being the odd one out: the proportion of births outside marriage today is far below 40% due to the lower rate of increase since the 1990s. The neighboring countries Netherlands and Belgium show extremely similar developmental trajectories over the last 50 years. Both displayed very low rates of non-marital fertility throughout the 1960s and '70s, but rises in rates of non-marital fertility picked up in the '70s and '80s and increased drastically in the '90s and '00s, although the rate of increase has begun to slow slightly as of late. The development in Ireland, on the other hand, is actually more similar to that observed in the Nordic countries, with an era of fast growth from the late '70s to the end of the '90s and a period of fairly modest increases from the mid '90s to this day.

Again I observe a common trend for this group of countries; however, this trend differs greatly from that observed for the Nordic countries. It is one of moderate but consistent growth over the last three decades. This trend is expressed in an absolute increase in non-marital fertility of roughly 10 percentage points per decade and declining relative increases as expressed in the CAGR. The data presented here do not indicate that the growth of the non-marital fertility ratio in the Core European countries has come to a halt yet, but that it is beginning to slow. Whether equilibrium in the non-marital fertility ratio will be reached remains to be seen.

A distinguishing feature of the Southern European countries is the overall lower level of non-marital fertility. Also, the increase in non-marital fertility over the last 50 years has been lower than in Nordic or Core European countries but has picked up markedly over the last two decades when the overall CAGR for this group was at 7.5%. Portugal seems a bit out of place in this group as the non-marital fertility ratio surpassed 40% as of 2009 and has always been at comparably high levels, a fact that is attributed to a traditionally high prevalence of non-marital fertility in Southern Portugal (Livi-Bacci 1971). Looking at the development over time, Portugal is actually very similar to the Core European country group, as it shows a constant and fairly strong increase in non-marital fertility since the late seventies. Spain, much like Portugal, is characterized by a pattern similar to the Core European countries. A period of slow growth beginning in the late seventies is followed by a growth spurt from the second half of the 1990s onward. Italy shows a similar pattern, although the period of rapid growth picked up much later, at around the turn of the century. The only two countries in all of Europe that have seen no sharp increase in non-marital fertility up until very recently are Greece and, to a lesser extent, Cyprus. Historically, these two orthodox countries are characterized by extremely low levels of non-marital fertility. While Greece exhibits a very slow rate of increase ever since the 1970s, which has picked up in the '90s and '00s, there was next to no increase (and next to no

non-marital fertility) in Cyprus until around the middle of the nineties. Since the middle of the noughties, the proportion of non-marital births has increased drastically and in 2009 exceeded 10%. The CAGR for the noughties of almost 20% is by far the most drastic growth rate observed in any country over the entire 50 year timespan. With the exception of Cyprus in the noughties, the countries surmised in the Southern European country group show very moderate rates of increase in non-marital fertility, which also began far later than in Northern and Central Europe. However, this group is somewhat heterogeneous in regards to the levels of non-marital fertility today, even though they are remarkably low on average.



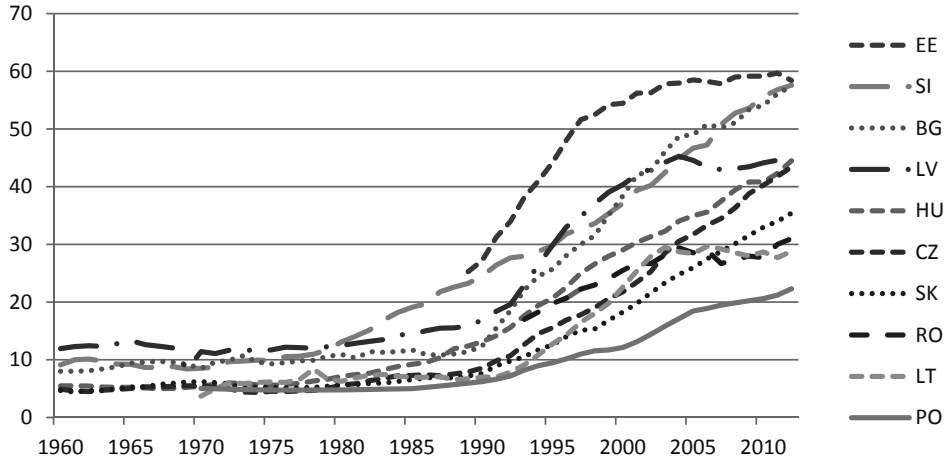
Graph 3.3 Non-marital fertility ratios in Southern Europe

The last group of countries to be examined here are the post-communist countries of Eastern Europe. Data for these countries are not as readily available, and as a result a number of time-series do not begin until the eighties or nineties. Overall, the development of non-marital fertility in this group appears very heterogeneous. The available data suggests that during socialism, rates of non-marital fertility were fairly stable, and that they began to increase mainly after 1990. A major exception here is Slovenia, where a process of steady and almost linear increase began in the late seventies and persists to this day. This is likely due to liberal family policies implemented in Slovenia at the time (Šarčević 1981). Data for Estonia are only available since 1989, but these data suggest that development in Estonia shows a pattern similar to that in Nordic countries. After a period of rapid increase in the nineties to levels far above 50%, the non-marital fertility ratio seems to have stabilized in the second half of the last decade at a very high level. A similar pattern, albeit at a far lower level, can be observed in Latvia. Latvia was characterized by a fairly high proportion of births outside marriage in soviet times, which began to increase slowly as of 1980. A rapid increase in non-marital fertility began in the nineties, when the rate increased by 22 percentage points in a single decade. This period was followed by a minor decline, and the rate has now stabilized at around 45%. A similar pattern, albeit at a far lower level can be

observed in Lithuania. After a sharp rise in the nineties, the non-marital fertility ratio has apparently reached a stable level at about 30% in the last decade. In Hungary, the non-marital fertility ratio increased in almost linear fashion ever since the early eighties, but after having exceeded 40%, it seems to have stabilized. Data for Poland are only available since 1970 but show a fairly unique pattern. For one, the non-marital fertility ratio was comparably high in the seventies but did not show any marked increase until after 1990. Even then, the rate of increase has been fairly moderate, and the non-marital fertility ratio today stands at only slightly over 20%. The development observable in the two nations which formerly constituted Czechoslovakia is very similar. In both the Czech Republic and Slovakia, a steady increase in non-marital fertility set in after 1989. After the separation of the two countries in 1993, the increase in non-marital fertility was more pronounced in the Czech Republic, which has already surpassed 40%. In Slovakia, on the other hand, the non-marital fertility ratio is now close to 35%. Data for Romania are only available since 1993 but show a steady increase in non-marital fertility in the nineties and the first half of the noughties. Since then a slight decline in the non-marital fertility ratio can be observed.

Overall, I observe a rather diverse pattern of development in the post-communist countries, with a common trend being the sharp increase of non-marital fertility after 1990, observable in both the high average CAGR and absolute change for this decade. There is indication that the Baltic countries have reached an equilibrium, similar to that observed in the Nordic countries. However, large differences in the levels of non-marital fertility in Estonia, Latvia and Lithuania can be observed in 2010. In countries with a strong orthodox or catholic heritage such as Romania or Poland, very low overall levels of non-marital fertility can be observed.

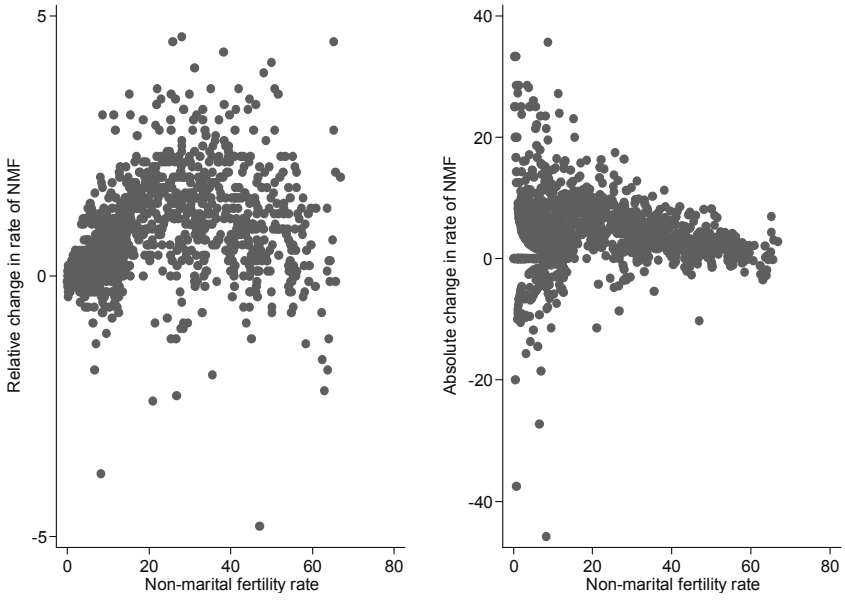
In conclusion, I find a universal trend towards an increase in non-marital fertility throughout Europe. However, the pattern of increase varies from country to country, between the country groups, and between time periods. In a number of countries, rates of increase have slowed or halted altogether, while other countries are in the midst of a period of rapid increase, and others look to be at the beginning of such a development. The most striking finding of this analysis is that there is a fairly large group of countries in which the increase in non-marital fertility has apparently come to a halt, and in which the non-marital fertility ratio has reached equilibrium. Such a pattern can be observed in the Nordic countries, the Baltic countries, Romania and Ireland. Even if these countries might have reached an end point, or perhaps a temporary equilibrium, in the development of non-marital fertility, this is definitely not the case for the majority of observed countries. I find a pattern of steady growth for all the countries of Core Europe, the majority of post-socialist and Southern European Countries. The Orthodox Countries Cyprus and Greece, on the other hand, appear to be at the starting point of such a development.



Graph 3.4 Non-marital fertility ratios in Eastern Europe

3.1.2 Examining Change in Non-Marital Fertility

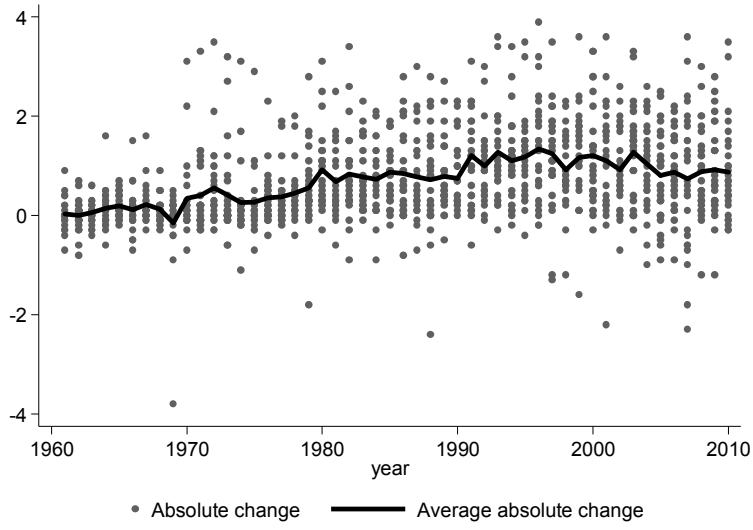
While I observe certain developmental patterns in the above descriptive analysis, I cannot confirm whether this actually is a uniform trend or whether the observed developments in the rates of non-marital fertility are primarily driven by period and country effects. In order to disentangle the different effects and determine whether there are any underlying patterns guiding the changes in the rates of non-marital fertility, the following section will further explore the effects of time and space.



Graph 3.5 Absolute and relative changes in non-marital fertility ratio

One observation from the previous descriptive analysis is that the rate of change in non-marital fertility seems to vary based on the overall level of non-marital fertility. Graph 3.5 highlights this association by plotting the non-marital fertility ratio against the absolute and relative changes in the rate.[11] The plot on the left hand side shows the distribution of absolute changes in the rate of NMF. There seems to be a curvilinear relationship; as the highest levels of average change can be observed in the middle of the distributions while at the ends of the distribution, changes are lower on average. However, it appears that absolute increases are lower for low values of non-marital fertility than for high levels.

A look at the right hand graph shows that the association between relative change and the rate of NMF is clearly negative, with relative changes being smallest for higher levels of NMF whereas they are greatest at low levels of non-marital fertility. Thus these graphs emphasize the conclusions drawn from the country level analysis that once the increase in non-marital fertility has picked up it undergoes a growth spurt, before slowing down and moving towards a country specific equilibrium. On the whole, this pattern is very reminiscent of a diffusion process. Such patterns have been observed previously for the spread of cohabitation among young women by Nazio and Blossfeld (2003).



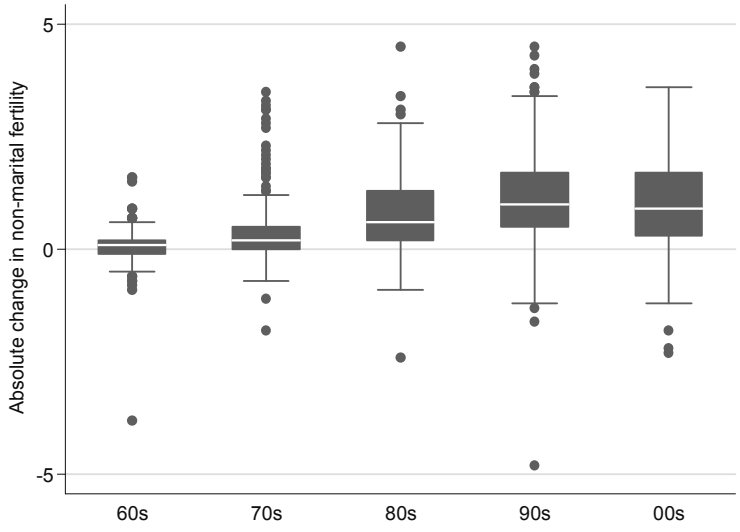
Graph 3.6 Changes in non-marital fertility over time

However, when studying country trends I also observed large differences in the changes of non-marital fertility ratios over time. Particularly in the 1960s, rates of non-marital fertility were very stable across Europe, whereas in all other decades under study I find major changes in the rates of non-marital fertility, at least in some regions. Graph 3.6 shows

11 The absolute rate of change is calculated as $NMF_t - NMF_{t-1}$ whereas relative changes are calculated as $100*(NMF_t - NMF_{t-1}) / NMF$ i.e. a value of 1 indicates that the rate has increased by one percent relative to the value in t.

absolute changes in non-marital fertility by year with the thick line corresponding to average changes over countries for a given year.

Graph 3.7 provides box plots of absolute changes in non-marital fertility by decade.[12] Overall, there is considerable variation in the change of non-marital fertility over time. During the '60s, very little change in rates of non-marital fertility becomes evident, and to a large extent the same is true for the 1970s. However, for the '70s a large number of outliers can be observed since the rapid rise in non-marital fertility picked up in the Nordic countries. For the '80s and '90s, I find larger variance in developmental patterns, as well as a marked overall increase in growth until the mid '90s. Since then, absolute increases have slightly declined and stabilized in the noughties, while variation in rates of non-marital fertility has increased again slightly over the last 10 years.



Graph 3.7 Changes in non-marital fertility by decade

In order to determine which of these observed patterns is of greatest relevance for describing changes in non-marital fertility, I estimated a number of multivariate regressions models employing panel corrected standard errors (Beck and Katz 1996). The results are shown in Table 3.2. In all of these models the absolute change in NMF between t-1 and t serves as the dependent variable. Model 1 considers only NMF, which is centered as NMF^2 is included in model 2. While I find that the rate of NMF has a significant and positive effect on changes in NMF, this effect doubles after inclusion of the quadratic term. Furthermore, the introduction of the quadratic term for non-marital fertility also leads to a far better model fit with R^2 increasing from .119 to .282. The negative algebraic sign for NMF^2 indicates that the effect of the level of non-marital fertility on the increase is curvilinear,

12 Note that data shown in Graphs 3.6 and 3.7 do not consider the same number of countries for the entire time frame, as data for a number of the Eastern European countries is not available prior to the 1990s.

as observed in Graph 3.5. Model 3 introduces decade dummies into the equation, with the 1960s serving as the reference category. Results indicate that increases in non-marital fertility are larger in all later decades, and that these differences are most pronounced during the '80s and '90s. However, the differences between the noughties and the sixties actually aren't significant. The inclusion of these decade dummies leads to a slight increase in overall model fit. Additionally, model 4 includes dummies for the different country groups with the Core Europe group serving as the reference category. While the inclusion of these dummies leads to an increase in model fit, I do not observe any significant differences between the core Europe group and the other country groups. Additional analysis (not shown here) finds that there exist no significant differences between the four country groups in regards to the changes in the non-marital fertility ratio. Model 5 estimates the effect of country fixed effects instead of dummies for the country groups, which leads to a considerable increase in explained variance from roughly 29% to 39%. If changes in rates of non-marital fertility were to follow a common pattern, no significant effects for different time periods or for individual countries should be observed. Thus these results indicate that while the level of non-marital fertility is of great importance[13] for predicting changes in non-marital fertility, distinct period effects and different patterns between countries can also be observed.

In conclusion, this analysis provides a number of interesting findings. First and foremost, it is clear that a general trend towards increases in non-marital fertility can be observed throughout Europe over the past five decades. However, while the growth in the non-marital fertility ratio appears to have slowed in the last decade, and actually come to a halt in some regions, most notably the Nordic countries, it is slowly picking up in other countries such as Greece or Cyprus, and still steadily increasing in other regions. The analysis of growth rates reveals patterns in the development of non-marital fertility over time. It appears that the growth of rates of non-marital fertility can be fairly well described as a curvilinear trend, which is somewhat reminiscent of a diffusion model. The fact that the regression analysis presented above also finds sizeable differences between countries and time periods makes it quite clear that such a trend is not a universal rule followed in all countries, however.

The analysis presented here is limited by a number of factors. For one, the non-marital fertility ratio is a fairly crude indicator which is unable to factor out changes in the age distribution of mothers or changes in the prevalence of births of different parity. Furthermore, it provides no information about whether changes observed here are attributable to increases in childbearing to cohabiting or single mothers. This analysis is limited to examining developments over time and disregards which country characteristics might be responsible for explaining such changes. This is intentional, as a more detailed analysis (albeit studying a shorter time frame) will be carried out in Section 4.1. As a first step, the following section will provide a detailed overview of country specific boundary conditions by examining attitudes, women's integration into the labor market, and the legal ramifications of marriage and cohabitation.

13 Variance component analysis (results not shown here), confirms the impression from the regression results that the level of NMF is by far the most important aspect in explaining variation in changes of non-marital fertility.

Table 3.2 Regression models predicting absolute change in non-marital fertility ratio

	m 1	m 2	m 3	m 4	m 5
NMF	0.019** (0.004)	0.038** (0.003)	0.036** (0.003)	0.037** (0.003)	0.037** (0.003)
NMF²		-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)	-0.001** (0.000)
Sixties			Ref.	Ref.	Ref.
Seventies			0.154** (0.055)	0.154** (0.055)	0.154** (0.055)
Eighties			0.342** (0.056)	0.342** (0.056)	0.342** (0.056)
Nineties			0.351** (0.067)	0.351** (0.067)	0.351** (0.067)
Noughties			0.083 (0.077)	0.083 (0.077)	0.083 (0.077)
Core				Ref.	
Nordic				-0.079 (0.092)	
South				0.082 (0.087)	
East				-0.059 (0.073)	
Country dummies					included
Constant	0.721** (0.034)	1.131** (0.046)	0.905** (0.065)	0.884** (0.073)	1.414** (0.126)
N	1245	1245	1245	1195	1195
R^2	0.119	0.282	0.292	0.312	0.385

Beta coefficients; standard errors in parentheses; N=1245; * $p < 0.05$, ** $p < 0.01$

3.2 Societal Boundary Conditions

This section aims to provide an overview of the legal, economic and social boundary conditions of parents' decision to marry or cohabit at time point of childbirth. Within the scope of this dissertation, providing in depth country profiles for all 27 countries under study would not have been feasible. As a result, this overview is limited to presenting data drawn largely from aggregate sources, be they economic or legal databases or social surveys. Some indicators presented here are unavailable for a number of countries, but as they are well suited to mapping certain concepts, they are included nonetheless. Many of the indicators highlighted here will later be employed within macro- or multilevel regression models. This overview presents data from three different domains:

A) Attitudinal data drawn from social surveys will be used to examine the social backing of marriage and the acceptance of alternative family forms in order to explore the nor-

mative backing of marriage hypothesis. On the other hand, the gender roles attitudes index is an indicator of the gender equality hypothesis.

B) I will also examine a number of economic indicators which aim to assess women's and specifically mothers' position in the labor market. These data are of interest as they relate to the independence hypothesis.

C) I will also examine data on legal boundary conditions and institutions. This includes the topics child care, taxation and parental rights. Theoretically, the availability of child care is associated with the independence hypothesis, as is data on taxation of single versus dual earner households.

The tables presented below include country level data. The means and standard deviations are calculated at the country level with each country receiving the same weight. For this reason, mean scores do not represent actual European population averages. In order to better contextualize the information presented here, the tables are arranged in accordance to the non-marital fertility ratio in 2012. Thus, Iceland appears in the first row of all tables while Greece appears in the last row. Additionally, Table A.1 in the Appendix provides an overview of the correlations among the indicators presented here.

A major limitation of the data presented is that they are merely cross-sectional. For all indicators, the objective is to present the most up to date data. However, particularly in regards to policy or institutional indicators such as child care participation, major changes have been initiated over the last decade in a number of countries following the Barcelona targets of the European Commission (Mills et al. 2014). Data on unemployment rates, the prime indicator of the insecurity hypothesis, are not presented here, as they tend to vary cyclically over time. Providing data for one reference year thus might be misleading. Section 4.1 will incorporate data on unemployment, and provide a longitudinal perspective.

3.2.1 Attitudes on Cohabitation, Marriage and Gender Roles

Within the theoretical framework proposed in Chapter 2, values and attitudes are seen primarily as social boundary conditions which mediate the decision making of couples to conceive a child within or outside of marriage. The first three columns of Table 3.3 present indicators which assess the approval of marriage and cohabitation in society, while column four contains what I have termed the gender roles attitudes index. This indicator assesses attitudes towards women's position in the labor market, particularly that of mothers.

Column one shows the percentage of the population agreeing with the statement, "Marriage is an outdated institution." This item is intended as an indicator of the normative backing of marriage hypothesis, the idea being that approval of marriage should also be associated with disapproval of the alternatives. A rather interesting finding in this regard is that in the Nordic Countries, all of which have historically exhibited very high rates of non-marital fertility, the disapproval of marriage is universally below the unweighted mean value. Disapproval of the institution of marriage is highest in countries such as Belgium, France and Luxembourg. These descriptive findings indicate that rises in non-marital fertility might not so much be related with a rejection of the institution of marriage in the Nordic countries.

Table 3.3 Family and gender roles indicators

	"Marriage is an outdated institution" % agreeing[1]	"It's okay to live together without being married" % agreeing[1]	„People who want children ought to get married" % disagreeing[2]	Gender role attitudes index[1,3]
Iceland	11	94	-	72
Estonia	20	76	-	62
Slovenia	25	73	60	68
Bulgaria	28	61	30	66
France	35	94	51	72
Norway	19	88	44	78
Sweden	21	94	45	77
Belgium	33	88	-	66
Denmark	13	96	48	78
United Kingdom	23	81	34	65
Netherlands	27	87	-	69
Latvia	20	75	24	66
Portugal	31	83	-	64
Hungary	19	70	-	67
Czech Republic	24	58	19	60
Finland	15	82	42	70
Austria	30	81	-	61
Spain	32	84	69[4]	67
Luxembourg	36	90	-	67
Slovakia	14	36	15	63
Ireland	23	77	47	60
Romania	20	60	-	63
Lithuania	18	53	10	58
Italy	19	54	-	61
Poland	18	61	25	58
Cyprus	19	46	-	55
Greece	21	70	-	59
Mean	23	74	38	65
Std. Dev.	6.7	16.1	16.9	6.1

(1) EVS Wave 2008-2010 ; (2) ISSP 2012 ; (3) Composite Indicator detailed in text ; (4) not fully comparable due to different scale

Column two presents data on the percentage of people agreeing with the statement "It is okay to live together without being married." The indicator assesses the degree of social acceptance of cohabitation. Overall, approval of cohabitation in Europe is widespread. In all countries with the exception of Slovakia and Cyprus, the majority of respondents

agreed that it is acceptable to live together without being married. The highest rates of approval can be observed in the Nordic countries (with the exception of Finland) and France. On the whole, the lowest rates of approval can be observed in the post-communist countries, as well as in Italy.

The most direct measure for assessing societal (dis)approval of non-marital fertility is the item "People who want children ought to get married." Unfortunately, attitudes regarding this survey item are only available for less than half of the countries under study. It is included here, nonetheless, in order to assess its relationship to other attitudinal indicators on marriage and cohabitation. The statement is met with high rates of approval in Slovakia, Poland and Lithuania, while it finds the least support in Slovenia, Sweden and France. With the exception of Slovenia, people in the post-socialist countries generally seem to be in strong agreement with this statement compared to the Northern and Central European countries. Little can be said in regards to attitudes in Southern Europe, as data is missing for most countries of this region.

When reviewing the association between these three indicators, I find a positive association between rejection of marriage and approval of cohabitation (correlation of .32). Similarly, at the country level disapproval of marriage is positively associated with acceptance of non-marital fertility (correlation of .46). These associations are not as pronounced as I would have assumed, however. This is likely due to the strong support of marriage evident in Nordic countries. Approval of cohabitation and non-marital fertility, on the other hand, show the expected strong correlation (.75). Examining the correlation between these three indicators and the non-marital fertility ratio in 2012 reveals surprising results. For one, there is next to no correlation with disapproval of marriage (.10), and the correlation with approval of cohabitation is stronger (.58) than that for approval of non-marital fertility (.46). These findings indicate that it might not be a rejection of the institution of marriage that leads to increases in non-marital fertility, but rather an increase in the acceptance of alternatives.

The final attitudinal indicator which will be assessed here is not directly related to the question of marriage and family forms, but instead measures the relative positions of the sexes in society. The gender role attitudes index aims at assessing attitudes towards women's role in society and the labor force and is comprised of the following three items taken from the European Value Study 2008-2010 wave:

> "*When jobs are scarce, men have more right to a job than women.*"
>
> "*A working mother can establish just as warm and secure a relationship with her children as a mother who does not work.*"
>
> "*Being a housewife is just as fulfilling as working for pay.*"

The thematic focus of these items is on women's - and particularly mothers'- involvement in the labor force. The composite indicator is generated by aligning items and aggregating them to a 100 point scale, with equal weighting of all three variables. A score of 100 corresponds to full approval of egalitarian gender roles, while a score of 0 corresponds to traditional perceptions of gender roles in all areas. The values shown in Table 3.3 are country averages. Countries with very egalitarian attitudes are France and the Nordic countries,

with Finland being the most traditional of that group. Countries such as Cyprus, Lithuania and Greece exhibit the most traditional attitudes. The clearest pattern evident in the data is that Nordic countries appear to have more egalitarian values than the rest of Europe. Southern European countries (with the exception of Spain) are more traditional, while attitudes in Central European and Eastern European countries do not show any specific pattern. Interestingly this indicator shows a strong positive correlation with the non-marital fertility ratio (.70), a value far higher than that of any of the other attitudinal items.

3.2.2 Labor Market Position of Women

In Chapter 2, the importance of women's position in the labor market for couples' decision to have a child within or outside of marriage is emphasized as part of the independence hypothesis. Table 3.4 presents data on women's labor market integration at the country level. It includes the female employment rate[14], the percentage of women working part-time, and the maternal employment rate for mothers of children younger than 15 and 3 years of age.

Considerable variation can be observed in women's employment throughout Europe, with Greece, Italy and Spain having the lowest rates of female employment, while in the Nordic countries and the Netherlands, rates are above 70%. On the whole, there appears to be a North-South divide with most Central European countries gravitating around the mean value.

The prevalence of part-time work, as shown in the second column of Table 3.4, adds more detail to the quality of women's employment. From a theoretical perspective, the effect of part-time employment should be somewhat ambivalent. While part-time employment increases the compatibility of work and family and improves women's bargaining position relative to men, at the same time, part-time work usually does not make mothers fully financially independent. When examining the distribution of part-time work among women in Europe, it becomes apparent that part-time jobs seem to be the exception in Eastern Europe. Among the former socialist countries, Estonia displays the highest rate at 13.3%, which is still far below the unweighted country mean of 24.5%. The Netherlands, famous for their one and a half earner model, exhibit the highest rate of part-time employment with 76.9%, followed by Austria and Belgium with rates of over 40%, and the Nordic countries in which rates are between 30 and 40%.

14 Note that I analyze the female employment rate for ease of comparison with the maternal employment indicators here. In chapter four I will be studying the female labor force participation rate as comparative data is available for longer time series.

Table 3.4 Women's position in the labor market (indicators)

	Female Employment Rate (Ages 20-64)[1]	Share of employed women working part-time[1]	Maternal employment rate - child under 15[2,3]	Maternal employment rate - child under 3[2]
Iceland	79.1	31.4	84.8	-
Estonia	69.4	13.3	63.4	21.5
Slovenia	64.6	12.2	84.4	75.7
Bulgaria	60.2	2.5	66.6	29.0
France	65.1	30.0	72.5	58.1
Norway	71.9	41.5	-	-
Sweden	76.8	38.6	80.3	71.9
Belgium	61.7	43.5	70.6	62.1
Denmark	72.2	35.8	84.0	71.4
United Kingdom	68.4	42.3	64.3	56.9
Netherlands	71.9	76.9	77.5	75.8
Latvia	66.4	11.0	69.9	60.8
Portugal	63.1	14.1	75.7	67.6
Hungary	56.4	9.3	51.7	6.0
Czech Republic	62.5	8.6	56.9	21.5
Finland	72.5	19.4	77.2	51.8
Austria	70.3	44.4	74.0	66.3
Spain	54.6	24.4	59.3	55.0
Luxembourg	64.1	36.1	67.9	72.7
Slovakia	57.3	5.5	56.7	18.7
Ireland	59.4	34.9	57.3	58.8
Romania	56.3	9.7	67.0	58.1
Lithuania	67.9	10.7	75.3	75.6
Italy	50.5	31.0	55.3	53.4
Poland	57.5	10.6	65.9	53.9
Cyprus	64.8	13.1	72.8	70.2
Greece	45.2	11.8	56.5	49.2
Mean	64.3	24.5	68.8	54.5
Std. Dev.	8.2	17.1	9.7	19.9

(1) Eurostat database, reference year 2012 ; (2) OECD family database reference year 2011 ;
(3) Children under 16 for IS, children (dependent) under 25 for DK, FI, SE

From a theoretical perspective, maternal employment is of special interest, as the independence hypothesis posits that mothers' ability to fend for themselves financially should mediate the attractiveness of getting married to a child's father. The employment rates of

mothers with children aged 15 and younger are on average slightly higher than those for women aged 20-64, and these two figures are highly correlated (.72). Particularly in the post-socialist countries of Eastern Europe (with Slovenia being a noticeable exception) as well as Southern European countries and Ireland, mothers participate less often in the labor market. The highest rates of maternal employment can be observed in the Nordic countries, the Netherlands and Slovenia. When examining the employment rate of mothers with children under 3 years of age, differences between countries become far more pronounced. A number of countries, particularly in Eastern Europe, exhibit extremely low employment rates for mothers with young children. The association between the employment of mothers with young children and women's employment (.38) is also much lower than for mothers with children up to age 15 (.78). Thus, the employment of young mothers seems to be dependent on different factors than women's employment. One such factor might be the possibility for part-time employment, as suggested by the high rates of maternal employment in the Netherlands, and the positive correlation between these two indicators (.51). Another factor which likely plays a role is the availability of child care, a point will explore further below.

When examining the bivariate correlations of these employment indicators and the non-marital fertility ratio, I observe a fairly strong correlation for the female employment rate (.67). The correlation for mothers with children under 15 is considerably lower (.47) while, surprisingly that for mothers with children under 3 is more or less nonexistent (-.08). These correlations indicate that while an independence effect for female employment can be observed, mothers' ability to stay continually involved in the labor market might not be as important to their independence as assumed. The percentage of mothers working part-time is positively associated with the non-marital fertility ratio (correlation of .26).

A further aspect pertinent to women's involvement in the labor force and the division of work within the household is women's earnings potential. If structural barriers to women's employment exist, specialization in partnerships becomes a more rational strategy for parents. However, the only comparative data available for Europe as a whole are unadjusted gender pay gaps. These figures are problematic, however, as they do not take into account selection effects into employment for women, which makes comparisons across countries difficult.[15] Thus, while in theory the gap between male and female earnings would be a fruitful indicator, the unavailability of an adjusted and fully comparable measure provides a major obstacle.

3.2.3 Legal and Institutional Factors

Legal and institutional arrangements can shape parents' decision to have a child within a marital or cohabiting union both directly and indirectly. On the one hand, laws can influence partners' decision making by treating marital and cohabitating unions differently, be it in regards to the status of partners relative to each other (i.e. inheritance) or in relation to children. On the other hand, laws and institutions have great power to shape the attractiveness of different forms of inner-familial division of labor. Unequal taxation of

15 For a discussion of selection effects and an overview of standardization measures see Pozellini, Aumayer and Wolf (2010).

dual earner and single earner households, or the lack of provision of affordable child care should increase the likelihood of male breadwinner households, as mothers' labor force participation becomes more problematic.

In order to follow up on the labor market related indicators presented in the last section, I will now examine indicators relating to child care. Within the theoretical framework proposed in Chapter 2, the availability of care for young children is specifically emphasized, as it enables mothers to stay financially independent and avoid career bumps due to extended absence from work. The first column of table 3.5 shows the child care participation rate for children under 3 years of age. I focus here on rates for children under 3, as there is far more variation across Europe in this age group (Mills et al. 2014), and the provision of care for children und 3 years old is of importance as it enables mother to quickly reenter the labor market. Overall, there is considerable variation in this indicator, with a majority of children under 3 attending child care in several Nordic countries and the Netherlands, whereas in Slovakia and the Czech Republic, child care for children in this age group is virtually nonexistent. There is a fairly large group of countries with child care participation rates of below 20%. This group includes the post-socialist countries (again with the exception of Slovenia) as well as Austria and Greece.

Column two of Table 3.5 shows government expenditure on care and home help services as percentage of GDP. This statistic includes expenditures on both child care for children under 3, as well as kindergartens which provide service for children ages 3 to 5. Here I also observe considerable variation across countries. The highest values can be observed for the Nordic countries, France and the UK, while the lowest levels of spending are observed in Greece, Cyprus, Poland and Slovakia. Even though it considers all children under school age, this measure is strongly correlated with the child care participation rate of under 3 year olds (.65).

Kershaw (2010) argues that the de-commodifying effect of child care is also dependent on its affordability. The third column of Table 3.5 thus provides OECD data on the net cost of child care (after considering both direct costs, tax reliefs and subsidies) as a percentage of family earnings for couples earning 167% of the average wage.[16] Unfortunately, data are unavailable for a number of countries, but those countries included here show considerable variation in costs of child care. Ireland is a major outlier in this respect, with child care costs exceeding a quarter of an average families' earnings, while in the majority of countries net child care costs are below 5% of the family income. A major shortcoming of this figure is that it fails to account for the degree to which low income households are entitled to special rebates on child care fees. What also becomes apparent is that there seems to be little association between cost of child care and the participation rate of children under 3 years of age (correlation of .15) or the degree of public spending on child care (correlation of .03). As expected, the availability of child care is closely associated with employment of young mothers (correlation of .64). Also child care participation (.43) and in particular the degree of public spending on child care (.61) show the expected positive

16 The standard OECD methodology for generating comparative indicators relating to income sets the benchmark as the earnings of the average worker in a country at 100%. Thus the value of 167% indicates that the reference household is earning 167% of the average worker.

correlation with the non-marital fertility ratio, while the association with child care costs (correlation of .08) seems negligible.

Table 3.5 Child care related indicators

	Child care Participation Rate for under 3 year olds in %[1]	Public spending on child care services as % of GDP[2]	Net child care costs as % of family income for family earning 167% of average wage[1]
Iceland	55.0	1.71	5.0
Estonia	17.5	0.35	3.7
Slovenia	33.8	0.5	13.7
Bulgaria	14.6	0.76	-
France	42.0	1.12	10.4
Norway	51.3	1.23	10.8
Sweden	46.7	1.43	4.7
Belgium	48.4	0.66	4.7
Denmark	65.7	1.43	8.9
United Kingdom	40.8	1.13	-
Netherlands	55.9	0.93	10.1
Latvia	16.1	0.63	-
Portugal	47.4	0.39	4.8
Hungary	8.8	0.66	4.2
Czech Republic	2.2	0.41	6.6
Finland	28.6	1.09	8.4
Austria	12.1	0.4	11.8
Spain	37.5	0.55	4.7
Luxembourg	38.6	0.41	5.4
Slovakia	3.0	0.35	3.9
Ireland	30.8	0.43	25.6
Romania	14.3	0.76	-
Lithuania	13.7	0.60	-
Italy	29.2	0.66	-
Poland	7.9	0.33	4.8
Cyprus	32.7	0.34	-
Greece	15.7	0.12	3.2
Mean	30.0	0.72	7.8
Std. Dev.	18.0	0.41	5.2

(1) OECD Family Database, Reference year 2008 ; (2) OECD Social Expenditure Database, Reference Year 2009

Taxation can also influence partners' decision to have a child within marriage or cohabitation, either indirectly, by favoring single or dual earner arrangements, or directly, by granting married couples more advantageous taxation. Table 3.6 includes two measures which compare relative taxation of single and dual earner households. Data are taken from the OECD and follow their standard methodology for taxation based indicators described above. The first column shows the difference between the taxation of a single earner household in which the breadwinner earns 133% of the average wage and a dual earner household in which each partner earns 67% of the average wage. The second column compares a single earner with 200% and two earners with 100% of the average wage each. A large majority of taxation schemes favor dual earner constellations, France and Slovakia being the only notable exceptions and Bulgaria and Estonia being fully tax neutral. Dual earners on the whole are slightly better off in the 200% vs 100%/100% scenario, but there is some country level variation. On the whole, the benefits for dual earner households are most pronounced in Sweden, Finland, Hungary and Greece. While theoretically one would assume that favorable taxation for dual earner households should encourage a more egalitarian division of labor between the sexes, this does not seem to be the case, as I find no meaningful correlation between these taxation indicators and women's or mothers' involvement in the labor force. Thus, it comes as no great surprise that the non- marital fertility rate and these taxation indicators are negatively correlated (-.30 for 133% and -.16 for 200%).

Table 3.7 provides information on whether countries tax married couples, individually (thus treating them the same as cohabitants) or jointly. Joint taxation schemes can act as a disincentive to marriage (see for example the discussion on marriage penalty in the United States). However, in most instances, particularly in countries with a splitting system, joint taxation provides a considerable marriage incentive for couples practicing a traditional division of labor.

Data for European countries suggest that individual taxation is the norm in most states. However, some countries have flexible systems which allow either for joint or individual taxation, depending on what is more beneficial to couples. Of the 27 countries studied here, only 7 countries tax married partners jointly. In two of these countries (Estonia and Luxembourg) joint taxation can be extended to cohabiters. A number of countries have policies which provide special incentives for marriage. Belgium makes an exemption to individual taxation for married couples as it allows 30% of family income to be applied to a spouse, equivalent to a system of partial income splitting. Like most other post-socialist countries, Bulgaria has a system of individual taxation, but it provides special tax credits to young married couples who have acquired a home. The Czech Republic grants special tax credits to taxpayers whose spouse earns low wages, an arrangement mimicking splitting arrangements. In France, one of the few countries with family taxation, married couples receive further advantages through the *quotient familial* and the *prime pour l'emploi*, policies also open to registered partnerships (PACS). The unit for taxation in Greece is the family, and up to 2014 there was an additional incentive for marriage for those employed in the private sector in form of a 10% marriage bonus. Iceland, while featuring an individual taxation scheme, allows for sharing of tax credit between spouses. This is similar to the situation in Italy, where taxpayers receive a tax credit for dependent spouses. In addition to family level taxation, Ireland also grants special rights to those married. For one,

the tax relief calculated for married persons is higher, and a homecare allowance is paid to non-working spouses. Much like Ireland, Slovakia pays a special allowance to spouses not working or caring for children.

Table 3.6 Taxation of single and dual earner couples

	Difference between net transfers to government for single and dual-earner couples with two children[1]	
HH earnings as percentage of average wage	133	200
Iceland	0.6	1.7
Estonia	0.0	0.0
Slovenia	2.0	2.8
Bulgaria	0.0	0.0
France	-0.4	-0.7
Norway	5.7	7.2
Sweden	8.8	14.2
Belgium	3.2	3.7
Denmark	1.5	5.9
United Kingdom	4.6	6.4
Netherlands	7.8	8.2
Latvia	1.0	0.3
Portugal	4.3	2.8
Hungary	9.2	11.3
Czech Republic	0.0	0.0
Finland	11.2	9.8
Austria	8.8	4.4
Spain	4.1	3.9
Luxembourg	2.7	2.7
Slovak Republic	0.0	-0.1
Ireland	6.8	8.1
Romania	3.2	2.2
Lithuania	2.7	1.8
Italy	7.0	8.8
Poland	0.5	0.3
Cyprus	-	-
Greece	9.3	9.8
Mean	4.0	4.4
Std. Dev.	3.6	4.1

(1) OECD Family Database, Reference Year 2010

Note: Value of zero indicates equal taxation, positive values favorable taxation of dual earners

Quantifying differences in taxation between cohabiters and married couples would have been desirable, but unfortunately, the OECD tax benefit models, on the basis of which the data in Table 3.7 are generated, cannot distinguish between married and unmarried couples. As a result, this overview must limit itself to description. Comparing the rates of non-marital fertility between countries with individual taxation (mean of 42.5%) and those without (mean of 36.4%) shows some sizeable differences between these country groups. The group of countries with family taxation includes both Greece, the country with the lowest non-marital fertility ratio, as well as Estonia and France, both of which exhibit some of the highest rates observed in all of Europe. Thus, drawing conclusions from these data seems a bit speculative. In order to fully assess effects of taxation on the rate of births outside of marriage, a longitudinal design which traces the changes in taxation regimes over an extended time period would be required.

Next I will move on to compare relative legal treatment of marriage and cohabitation. In a review of the legal treatment of cohabitation in Europe Perelli-Harris and Sanchez Gassen (2012) highlight the following historical developments towards equal legal status of married and cohabiting parentage.

1. Abolishment of laws that discriminate against unmarried children
2. Granting single mothers sole rights to their children
3. Equal rights of unmarried fathers

While Perelli-Harris and Sanchez Gassen summarize that points one and two have been achieved more or less universally within Europe, the rights of unmarried fathers have yet to be fully aligned (2012, p. 444). Parental rights entail financial responsibilities, rights of custodianship for under age children, and visitation rights in the case of partnership dissolution (European Union 2015). Thus, not being granted these rights could be seen as a considerable marriage incentive for fathers interested in having a say in their child's future.

Table 3.7 Taxation of married couples

	Individual Taxation	Taxation favoring married couples
Iceland	Yes	with exception of capital income of married couples; tax credit can be shared between spouses
Estonia	No	independent of marital status
Slovenia	Yes	
Bulgaria	Yes	special tax credit for young married couples acquiring a home
France	No	quotient familial and prime pour l'emploi applied to married couples and PACS (Nachlesen)
Norway	Yes	married couples can be taxed jointly
Sweden	Yes	
Belgium	Special	up to 30 percent of family income can be applied to spouse with lower income
Denmark	Yes	
United Kingdom	Yes	
Netherlands	Yes	capital income of spouses can be taxed jointly
Latvia	Yes	
Portugal	No	
Hungary	Yes	
Czech Republic	Yes	tax credit for spouse with low wages
Finland	Yes	
Austria	Yes	
Spain	Yes	married couples can be taxed jointly
Luxembourg	No	cohabiters can be taxed jointly if they wish to do so
Slovakia	Yes	Spouse allowance paid for those caring for young children or unemployed
Ireland	No	Individual taxation of spouses is possible, homecarer allowances paid for non-working spouse, married persons receive higher level of tax relief
Romania	Yes	
Lithuania	Yes	
Italy	Yes	tax credit for dependent spouse
Poland	No	
Cyprus	Yes	
Greece	No	marriage benefit paid to married individuals employed in private sector

Sources: OECD Taxing Wages; for non OECD countries EU Taxes in Europe database

Table 3.8 provides information on cohabiting fathers' parental rights. In most European countries it is customary that once parentage has been established, full parental rights are extended to the father. For married couples, women's spouses are usually automatically assumed to be a child's father, while for unmarried couples the father needs to formally

accept fatherhood of a child. In Table 3.8 I have classified countries according to whether they automatically assign parental rights and whether this process entails nothing more than administrative procedures, usually by acknowledging patrimony. Among all of the 27 countries under study, only 5 do not provide cohabiting fathers with automatic rights to their children. In Austria, the process of acknowledging unmarried fathers' parental rights involves legal steps with a judge having to approve fatherhood, making the barriers to accepting unmarried parenthood, while not insurmountable, far higher than in most other European countries. In Greece, the formal legal situation is similar to that in Austria: a judge must decide whether unmarried fathers receive parental rights. Cyprus is a very unique case in regards to the legal treatment of unmarried parenthood. Initially, unmarried mothers are automatically assigned sole custody, but once fatherhood is legally established, the father is granted sole parental rights. The Netherlands and Luxembourg have a different barrier to establishing paternal rights in that they can only be received with the mother's consent.

From a legal perspective, parental rights are a very strong incentive for fathers to have a child in marriage rather than in a cohabiting union. Fathers not granted parental rights have no rights to visit the child in case of the dissolution of a union, and children are not eligible to inherit. A comparison of non-marital fertility ratios in countries that grant automatic parental rights to cohabiting parents and those that do not, support this assumption. On average, non-marital fertility is far lower in these five countries (mean of 28.8%) than it is in the remainder of Europe (mean of 44.0%). Interpreting this association as causal would be dangerous, however. The simple fact that childbirth within cohabiting unions is a common practice could lead legal systems to adapt to given circumstances (compare Ingelhart and Welzel 2005). As Perelli-Harris and Sanchez Gassen (2012) pointed out, awarding equal rights to unmarried fathers is a fairly recent trend in jurisdiction in many countries. Much like the effect of taxation, the effects of legal boundary conditions would have to be analyzed longitudinally, in order to allow researchers to draw clear conclusions. On the whole, the data on taxation and legal issues echo the findings of a recent article by Sanchez Gassen and Perelli-Harris (2015) who examine the legal status of cohabiters. They find that equal treatment of cohabitation and marriage is correlated with prevalence of cohabitation. But at the same time, there are a number of countries in which regulations treat both as equal and rates are low and vice versa.

Table 3.8 Parental rights of cohabiting fathers

	Automatic parental rights for cohabiting fathers?	Note
Iceland	Yes	Only when in a registered cohabiting union.
Estonia	Yes	Both parents have equal rights.
Slovenia	Yes	
Bulgaria	Yes	
France	Yes	If parentage is accepted.
Norway	Yes	
Sweden	Yes	Not until father is 18 or older.
Belgium	Yes	
Denmark	Yes	If living together or mutually agreed upon.
United Kingdom	Yes	
Netherlands	No	Only if legally acknowledged with mother's consent.
Latvia	Yes	When living together.
Portugal	Yes	
Hungary	Yes	Once paternity is established.
Czech Republic	Yes	
Finland	Yes	Parents jointly choose how custody is assigned.
Austria	No	Unmarried parents can get joint custody by court decision.
Spain	Yes	
Luxembourg	No	If legally acknowledged by the mother.
Slovakia	Yes	
Ireland	Yes	
Romania	Yes	As long as parents live together.
Lithuania	Yes	
Italy	Yes	If acknowledged and living together.
Poland	Yes	
Cyprus	Special	Once child is judicially recognized father takes sole responsibility. Otherwise it stays with mother.
Greece	No	Can be permitted by court order.

Sources: Council of Europe Family Policy Database; European Union: Your Europe; Danish Act on Parental Responsibility.

3.2.4 Summary

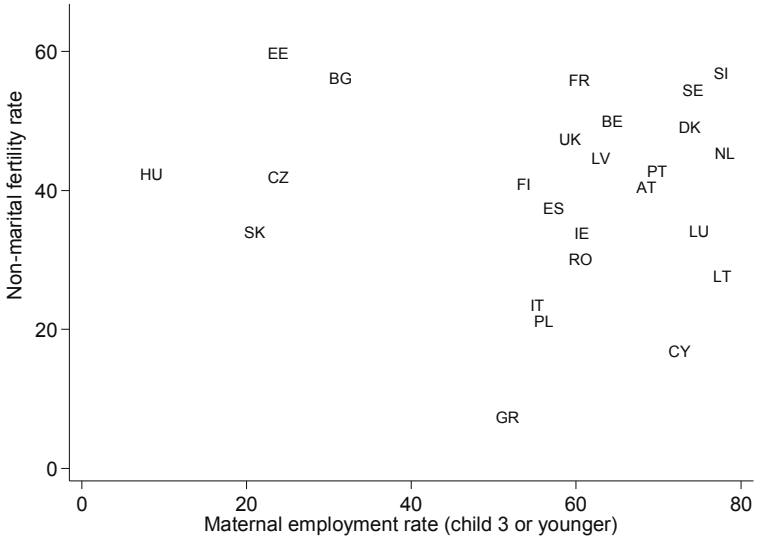
The objective of this section is to provide an overview of various boundary conditions pertinent to couples' decision to have a child within or outside marriage. I review attitudes on family and gender roles, summarize women's position in the labor market, and outline a number of legal and institutional boundary conditions. In an attempt to place indicators in perspective, I also examine associations between indicators and the non-marital fertility ratio at the country level. While the examination of correlations between macro-level indicators should not be seen as final evidence, I would nonetheless like to summarize these results in light of my hypotheses.

As only one indicator for the gender equality hypothesis is considered, and the gender role attitudes index shows the highest correlation with the non-marital fertility ratio of all variables considered here, this can be seen as strong initial evidence for this hypothesis. However, as the index is also strongly correlated with women's employment and child care indicators, it remains to be seen whether an independent effect of attitudes can be observed in a multivariate analysis. The normative backing of marriage hypothesis is examined via attitudinal and institutional indicators. Evidence from the three attitudinal items supports the normative backing of marriage hypothesis only in part. Notably, the finding that there is no real association between disapproval of marriage and non-marital fertility is in conflict with one of the core assumptions of this hypothesis. This might be a consequence of the wording of the survey item "marriage is an outdated institution." Alternatively some argue that the deinstitutionalization of marriage actually brings with it a positive reevaluation of marriage as a rare good (Lauer and Yodanis 2010). Recent qualitative evidence from Norway (Perelli Harris and Bernardi 2015; Lappegård and Noack 2015), lends support to this interpretation. As discussed above, data on institutional indicators is not fully conclusive, but results on the equal legal treatment of married and cohabiting couples support the normative backing of marriage hypothesis. Data on taxation also points in this direction, but in this case the evidence is less clear.

The independence hypothesis is associated with indicators on women's labor market involvement, the availability of child care, and taxation of single and dual earners. With the exception of the maternal employment rate for children under 3 years of age, all labor market related indicators confirm the independence hypothesis. The negative relationship between non-marital fertility and the employment rate of mothers with young children is somewhat surprising. However, when examining the relationship graphically in a scatterplot (see Graph 3.8), I find that a small group of post-socialist countries (Estonia, Bulgaria, Czech Republic, Slovakia and Hungary) which exhibit extremely low maternal employment rates, distort the relationship. When examining the relationship between non-marital fertility and maternal employment separately for both groups, I find positive associations for both groups (.48 for this group of post-socialist countries and .38 for the other countries).

The association between the child care related indicators and non-marital fertility also follows the expected direction. While no real association can be observed for the child care cost indicator, this could just as well be due to the quality of this indicator. The data on taxation of single and dual earners, on the other hand, is negatively associated with non-marital fertility, a finding contrary to theoretical predictions. As has been argued

above, examining the influence of legislation and taxation would likely benefit from a longitudinal perspective. Unfortunately, such an analysis is not feasible within the scope of this thesis.



Graph 3.8 Scatterplot of non-marital fertility and maternal employment

The data presented in this section provides some first insights in regards to the hypotheses postulated in Chapter 2. In the next section, I will examine results of previous studies which have dealt with childbearing outside of marriage in Europe. With this overview, I hope to glean further information on common findings and how they relate to my proposed hypotheses before moving on to Chapter 4.

3.3 Existing Research

In this section I provide an overview of research on childbearing outside of marriage in Europe. The focus of this review is on comparative European research and childbearing in cohabitation. I will first attempt to provide a short historical overview of comparative research on the topic. I will then branch out slightly to discuss related fields and subthemes which are not of central importance to this thesis. This overview will be followed by the discussion of findings which relate to the hypotheses, outlined in Chapter 2. Here I will also explore findings for pertinent country specific studies, as well as results from comparative

research on marriage and cohabitation. Research from the United States and other parts of the world are also cited occasionally, but the focus is placed on Europe.

Comparative research on the topic of childbearing outside marriage was very rare previous to the turn of the century (Goode 1961, Hartley 1975, Tomasson 1976, Carlson 1982, Höpflinger 1985). Common to these early studies is that they utilize country level data, drawn from vital statistics registers, to compare rates or ratios of non-marital fertility either between countries or over time. This analysis strategy is largely attributable to the lack of comparative microdata available prior to the nineties in the European context. With the introduction of the Fertility and Family Survey (FFS), which was carried out in the early 1990s in 23 countries under the auspices of the United Nations Economic Commission for Europe (UNECE),[17] such data became available and have been utilized in a number of studies. Another comparative data source which has been used extensively in recent years (Perelli-Harris et al. 2010; Perelli-Harris et al. 2012; Lappegård, Klüsener and Vignoli 2014) is the FFS successor study, the Gender and Generations Survey (GGS) (Vikat et al. 2007), which is also conducted under the auspices of the UNECE.

Among the first to publish comparative research on the topic of non-marital fertility in Europe on the basis of microdata was Kathleen Kiernan (1998; 2001). She compares 9 Western European countries on the basis of FFS data. While her analysis is largely descriptive, she did provide a number of significant contributions to the literature. For one, it was Kiernan who first pointed out that childbearing outside of marriage in Western Europe occurs largely within the context of partnership, and not to single mothers. Kiernan (2004) was also one of the first researchers to argue that childbearing in cohabitation might actually be associated with economic disadvantage, a finding which stood in contrast to the assumptions of the second demographic transition, that new family forms would likely be practiced by those who rejected marriage due to their normative beliefs (Lesthaeghe and Neidert 2006).

A large scale research undertaking of particular interest to this study is the Special Collection of *Demographic Research* published by Frejka, Sobotka, Hoem and Toulemon (2008), which focused on childbearing trends and policies in Europe. In this volume, recent demographic trends are examined for 18 European countries, including many in Eastern Europe. One of the topics covered is childbearing outside of marriage (Sobotka and Toulemon 2008), and I will be referring to the results of respective country studies here from time to time.

The researcher most active on the topic of non-marital fertility in Europe over the last decade is undoubtedly Brienna Perelli-Harris. During her time at the Max Planck Institute for Demographic Research in Rostock she initiated a large scale research project on the topic of non-marital fertility.[18] An important achievement of this project is the establishment of the Harmonized Histories (Perelli-Harris, Kreyenfeld and Kubisch 2010), which combine data from the FFS and its successor the GGS with national surveys for 15 European countries and the US. In cooperation with a number of collaborators, Perelli-Harris has carried out research on the development of childbearing in cohabiting unions (Perelli-

17 For comprehensive information on the FFS consult http://www.unece.org/pau/ffs/ffs.html

18 The projects homepage nonmarital.org provides a thorough overview of the associated research activities and publications.

Harris 2010, Perelli-Harris and Gerber 2011), the legal boundary conditions in Europe (Perelli-Harris and Sanchez Gassen 2012; Sanchez Gassen and Perelli-Harris 2015), qualitative research on the meaning of cohabitation (Perelli-Harris et al. 2014; Perelli-Harris and Bernardi 2015) and more recently the interrelation between the development of divorce and non-marital fertility (Perelli-Harris et al. 2015). The most cited work written during the course of this project is likely also the most important comparative article on childbearing in cohabitation in Europe (Perelli Harris et al. 2010). This article shows that the predictions of the second demographic transition (Lesthaeghe and Neidert 2006), which conceptualizes childbearing in cohabitation as a life style choice of anti-authoritarian elites, are false. Instead Perelli-Harris et al. (2010) propose that childbearing outside of marriage is closely linked to economic disadvantage. More recently, Perelli-Harris has headed a comparative qualitative inquiry on the meaning of cohabitation in Europe, which resulted in a Special Collection of *Demographic Research* (Perelli-Harris et al. 2014; Perelli-Harris and Bernardi 2015).

A further researcher from the Max Planck Institute in Rostock, who has made significant contributions to the comparative literature on non-marital fertility in Europe, is Sebastian Klüsener (Klüsener, Perelli-Harris and Sanchez Gassen 2013; Lappegård, Klüsener and Vignoli 2014; Klüsener 2015; Klüsener and Goldstein 2016). The research of Klüsener is of particular interest as he has conducted analysis of non-marital fertility at the regional level and over extended periods of time. This research (Klüsener 2015, Klüsener and Goldstein 2016) similar to Kok (2009) and Trost (1978) shows that historic patterns of non-marital fertility persist and can help to explain regional variation today. A further important finding from the analysis of data at the regional level is that variation in non-marital fertility ratios at the country level is far larger than at the level of sub-regions, but that variation within countries is increasing over time (Klüsener, Perelli-Harris and Sanchez Gassen 2013). An article that is of particular interest here is a working paper written in cooperation with Lappegård and Vignoli, which employs a multilevel modelling approach to examine predictors of childbearing in cohabitation in Europe from a comparative perspective. To the best of my knowledge, this is the only previous study which has attempted to employ such an approach. Where appropriate, I will be discussing the findings in the subsections below.

While the focus of this review is on Europe, a number of comparative articles on non-marital fertility in Latin America have been published recently which are also of interest. Esteve, Lesthaeghe and López-Gay (2012) study prevalence of cohabitation in 13 Latin American countries on the basis of 1970-2000 census microdata and observe a boom in cohabitation over this time period, as well as the persistence of pre-Christian cohabitation behavior. Lopez Gay et al. (2014) map childbearing in cohabitation in Latin America at the regional level and find considerable within country variation, much like Esteve, Lesthaeghe and López-Gay (2012). A recent article by Laplante et al. (2015) specifically examines childbearing in cohabitation in Latin America. The total fertility rate for women living in cohabitation and marriage is calculated on the basis of census microdata. Only minor differences in these rates are observed in most countries, but the total fertility rate is slightly higher at younger ages for cohabiters. Furthermore, Laplante et al. (2015) examine the educational gradient of childbearing in cohabitation and find that while the gradient was very steep in the 1980s, it is no longer as pronounced in the 2000s. This is attributed to the

fact that the percentage of women with high education cohabiting and having children in cohabitation is increasing.

There is also a subtheme within the literature on childbearing in cohabitation which is focused on studying the timing of transitions into marriage or cohabitation in response to a non-marital pregnancy. This line of research tends to be more interested in causality and methodological issues and when and whether pregnant women transition into different family forms, and pays only little attention to the sociodemographic antecedents of these processes. I will shortly outline a number of these studies and some of their key findings. One of the earliest studies which examine transitions from cohabitation after pregnancy is that carried out by Manning (1993), which compares different racial groups in the United States. Similarly, Brien, Lillard and Waite (1999) examine the interrelationship of family building processes for the U.S. and also focus on differential patterns by race. Blossfeld and Mills (2001) summarize findings from Canada, Latvia, Western and Eastern Germany and the Netherlands, but their argument is mainly focused on how to properly establish causality. Other authors are primarily interested in the timing of transitions from cohabitation to marriage. Baizán, Aassve and Billari (2004) compare the different patterns in Sweden and Western Germany. Perelli-Harris et al. (2012) study transitions into marriage in 11 European countries, and find somewhat different patterns of transition throughout Europe. This line of research has revealed a number of interesting findings. Brien et al. (1999), for example argue that childbearing and marriage decision should be seen as interrelated family building processes due to the tight link between events. Furthermore, there is ample evidence that the rate of shotgun marriages has been declining (Steele et al. 2006 for the UK; Hărăguş 2014 for Hungary, Romania and Bulgaria; for comparative evidence see Sobotka and Toulemon 2008, p. 113). However, the comparative analysis by Perelli-Harris et al. (2012) finds somewhat diverging trends throughout Europe. A further interesting finding by Perelli-Harris et al. (2012) is that the majority of non-marital births in Europe are converted to marriage within 3 years of birth.

Literature on cohabitation is only consulted in passing here. My main reservation towards this literature is that predictors of unmarried cohabitation are actually quite different from those of childbearing within cohabitation. While cohabitation is very common among those with high education, this group tends to be less likely to have children in cohabiting unions. Neels and Perelli-Harris (2013) come to the conclusion that while those with high levels of education often live in cohabiting unions, they rarely have children outside of marriage. Similarly, Potârcă, Mills and Lesnard (2013) observe that in France and Romania those with high levels of education most often live in long-term cohabiting unions but rarely have children in cohabitation.

The literature on cohabitation does provide some interesting heuristics of the diffusion of cohabitation within society. Within such models, high prevalence of childbearing in cohabitation is commonly perceived as an endpoint in the societal diffusion of cohabitation. Heuveline and Timberlake (2004) compare 16 industrialized nations (14 of which are European) and classify states on the basis of incidence, duration and proportion of cohabiting unions ending in marriage. They distinguish the following patterns of cohabitation in society: marginal, prelude to marriage, step in marriage formation process, alternative to single, alternative to marriage, and finally, indistinguishable from marriage. Sobotka and Toulemon (2008) provide a simplified model of the diffusion of cohabitation, which

they claim is broadly applicable across countries. It distinguishes between the following three steps:

1) Diffusion: Cohabitation is mainly practiced by young adults at the beginning of partnerships, a practice which is then adopted by a majority of young couples.
2) Permanency: The duration of cohabiting unions increases, and cohabiting unions are less often converted into marital unions.
3) Cohabitation as a family arrangement: A pregnancy no longer automatically leads to marriage among cohabiters, and childbearing in cohabiting unions becomes a common practice.

However much like the second demographic transition, such a heuristic implies a unidirectional development. Personally, I see little gain in such a model as it tells us nothing about the underlying social mechanisms and which factors might actually play a role in such a development. Also such a heuristic does not consider how legal factors can shape patterns of cohabitation such as in the former German Democratic Republic (Konietzka and Kreyenfeld 2002; Konietzka and Kreyenfeld 2005) or in Slovenia (Stropnik and Šircelj 2008, p. 1031) where policy changes induced rapid changes in cohabitation and childbearing in cohabitation which seem to have persisted. Furthermore, a recent article by Hiekel, Liefbroer and Poortman (2014) emphasized that in most countries of Europe there is considerable variation in the meaning cohabiters attach to the institution. This finding seems to imply that a classification of countries in regards to which stage in the diffusion of cohabitation they have reached might be an oversimplification. Work on the diffusion of cohabitation by Nazio and Blossfeld (2003) does provide some interesting insights into the underlying social processes, however. On the basis of innovation diffusion theory Nazio and Blossfeld argue that a) the prevalence of cohabitation within peer networks, b) the level of social stigmatization of cohabitation and c) the actual utility of the institution influence its diffusion within society.

I will now move on to examine empirical evidence from both comparative and single country studies regarding the hypotheses postulated in Chapter 2. While there is a fairly large body of empirical evidence relating to some of these hypotheses, others, particularly those which relate to attitudes, have not been explored extensively. This can be attributed to a lack of available attitudinal data (Liefbroer and Fokkema 2008) and, on the other hand to the preferred methods of analysis. Demography displays a strong preference for longitudinal analysis on the basis of retrospective event history data, and explanatory variables tend to be limited to basic sociodemographics. Multilevel designs which allow researchers to consider values, attitudes or economic boundary conditions at the level of countries are far less common.

3.3.1 Status Attainment

The status attainment hypothesis postulates that higher levels of social status should be associated with higher likelihood of being married at the time of childbirth. The underlying mechanism is inspired by arguments put forward by Cherlin (2004) and Edin and Keffalas (2005), who argue that marriage as a social institution has different economic prerequisites than cohabitation and commands symbolic value.

This hypothesis has been widely adopted into the European discourse on childbearing in cohabitation, most prominently by Perelli-Harris et al. (2010), who perceive the negative association between education and childbearing in cohabitation as a pattern of disadvantage. Against the background of the U.S. literature, Perelli-Harris et al. (2010) argue that a negative educational gradient of childbearing in cohabitation can be observed. On the basis of GGS data for 8 countries, a convergence towards a negative educational gradient of childbearing in cohabitation is observed after 1990. In all countries examined, with the exception of Italy (where a significant positive gradient can be observed), the study finds that the negative gradient for cohabitation is more pronounced than for marriage. However, these effects are only significant for Norway, Russia and the UK. Furthermore, considerable differences in the magnitude of this effect can be observed. The article goes on to analyze time trends in the educational gradient. The only significant result is reported for France. Here the article finds clear evidence that in earlier cohorts, in which only few births were to cohabiters, cohabiting parents tended to be better educated. In conclusion, it is argued that the second demographic transition did not foresee the economic developments of globalization which increases parents' insecurity. In reference to Edin and Kefallas (2005), the educational gradient of childbearing in cohabitation is explained as a consequence of low SES women's desire for children but a lack of financial resources to get married.

Similar findings are reported in earlier single country studies. Kravdal (1999), who examines transitions from cohabitation to marriage in Norway, observes that costs of marriage seem to inhibit transitions into marriage, and finds small effects of income and education. Kiernan and Smith (2003) observe a negative association between educational level and mothers' marital status in the UK. Konietzka and Kreyenfeld (2005) observe a negative association between education and childbearing in cohabitation in Eastern Germany but find contrary evidence for Western Germany.

The results from country specific chapters of the *Demographic Research* Special Collection discussed above also provide some information on the association of education and non-marital fertility. However, these analyses only examine childbearing outside of marriage and not specifically in cohabiting unions. Results for Slovakia (Potančoková et al. 2008) find that childbearing outside of unions is very rare for those with high levels of education. Stropnik and Šircelj (2008) report that in Slovenia non-marital fertility used to be confined more to lower social strata, but today it is actually more common for women with at least higher secondary education.

An analysis on the basis of Greek vital statistics (Gavalas, Rontos and Salvati 2014) finds that births outside of marriage in Greece can largely be attributed to foreign born women. For Greek women, the study finds that women who are not married at time of childbirth tend to be comparatively young and very poorly educated. However, this analysis also does not distinguish between single and cohabiting mothers. Similarly Štípková (2015) finds a negative educational gradient of childbearing outside of marriage in the Czech Republic.

A recent study from Lithuania which studies transitions from cohabitation to marriage makes an interesting observation (Maslauskaitėa and Baublytėb 2014). It finds that in socialist times there was no strong association between education and transitions to marriage. However, in post-socialist Lithuania such an association becomes apparent.

Similar evidence is observed in a very interesting study (Hărăguş 2015) which compares three Eastern European countries in regards to childbearing in cohabitation, both before

and after 1989. This article finds that conversion rates of cohabitation to marriage in response to pregnancy have declined after 1989 in all three countries under study. These patterns are more pronounced in Bulgaria and Hungary than in Romania. When examining transitions by education levels, Hărăguş observes a positive educational gradient in the transition from cohabitation to marriage for Romania and Bulgaria but none in Hungary. The author argues that the transition from socialist to market economy brought with it massive economic hardship in Romania and Bulgaria which mainly affected lower classes. Hungary, on the other hand, is among the economically more successful former socialist countries, and thus Hărăguş argues that it might be displaying a pattern in accordance to the second demographic transition.

One of the topics explored in a recent country comparison of Romania, Russia and France examining family formation processes is parents' likelihood of living in a cohabiting union (Potârcă, Mills and Lesnard 2013). In this analysis, on the basis of GGS data, the authors observe that while long-term cohabitation is more common among the highly educated in Romania and France, it is more common among groups with lower education in Russia. However, in all countries there is a negative correlation between education and non-marital cohabitation with kids. The theoretical focus of the analysis is placed on the second demographic transition, and the authors conclude that as a theory, the second demographic transition makes too many general predictions and does not account for country specific path dependencies and boundary conditions.

Further comparative evidence for a negative association of education and childbearing outside of marriage is provided in a recent conference paper by Trimarchi and VanBavel (2015). The authors examine how educational combinations of partners affect marital status at time of childbearing. On the basis of the GGS and the Italian Family and Social Subjects Survey, they examine 12 European countries. They find that when either parent possesses tertiary education, the likelihood of having a child in cohabitation as compared to marriage decreases in all countries examined. However, the magnitude of this effect varies considerably between countries. Trimarchi and VanBavel initially hypothesized differential effects for fathers' and mothers' education. However, the analysis does not confirm this assumption.

The multilevel analysis conducted by Lappegård, Klüsener and Vignoli (2014), mentioned above, includes data for 16 European countries and finds that the likelihood of living in a cohabiting union at time of childbirth is negatively associated with mothers' education.

While there are a number of single country (not all of which have been discussed here) and comparative studies that examine childbearing in cohabitation and propose arguments relating to the status attainment hypothesis, the focus of this research tends to be placed on education and rarely considers other variables which might be related to social status. My interpretation of the research findings presented here is that a negative association between education and childbearing can be observed in a majority of European countries. Comparative studies indicate that there are differences in the magnitude of this effect, and that this pattern is not universal. The results for Italy in Perelli-Harris et al. (2010), for Western Germany in Konietzka and Kreyenfeld (2005) or Hungary (Hărăguş 2015), for example, do not match this pattern. Findings that effects of education might change over time within countries (Perelli-Harris et al. 2010 for France; Maslauskaitėa and Baublytėb

2014 for Lithuania; Stropnik and Šircelj (2008) for Slovenia) further support the idea that effects are very much context dependent.

3.3.2 Economic Independence

Building on the work of Gary Becker (1991), the independence hypothesis assumes that women with more labor market specific capital should be less financially dependent on their spouse, and thus be more likely to forego marriage in favor of cohabitation. I argue that this effect should be more pronounced when women can utilize their human capital in the labor market, and assume that the degree of compatibility of work and family life moderates this relationship. In regards to the effect of mothers' education, the prediction of the independence hypothesis is very much at odds with those of the status attainment hypothesis. As shown in the previous subsection, the empirical reality in Europe seems to offer considerable support for the status attainment hypothesis. Unfortunately, very little scholarly attention has been directed towards the association between other socio-economic factors such as mothers' employment and family status at birth. Two articles by Konietzka and Kreyenfeld's (2002; 2005) are a notable exception.

Examining the marital status of mothers living in partnership with a child between 3 and 6 years of age, Konietzka and Kreyenfeld (2002) observe a strong positive association between mothers' employment and cohabitation in Western Germany. In Eastern Germany this association is less clear. Konietzka and Kreyenfeld argue that this is due to the fact that Eastern German women, who are not employed full-time, have reduced their market work involuntarily and do not see themselves as homemakers. Konietzka and Kreyenfeld also examine whether the relative educational attainment of partners influences marital status, and find that in Western Germany mothers with more education than their partners are more often cohabiting while in Eastern Germany the contrary is the case. A pooled model reveals that this difference is not significant, however. Thus while this article finds evidence that living with young children in a cohabiting union in Western Germany tends to be associated with dual earner arrangements, this is not the case for Eastern Germany. The authors suggest that in Eastern Germany female breadwinner households might actually be a relevant group.

A second article by Konietzka and Kreyenfeld (2005), which compares childbearing in cohabitation and marriage for Eastern and Western Germany, studies mothers with children less than one year of age. The analysis shows that cohabiting mothers are most likely to be economically independent (based on their main source of earnings) and cohabitation is more common in dual earner households. This finding can be interpreted as evidence for the independence hypothesis. Furthermore, Konietzka and Kreyenfeld find that in Western Germany highly educated mothers are most likely to be cohabiting, while in the East mothers with high levels of education are actually more likely to be married. It is argued that this can be attributed to different institutional arrangements in both parts of Germany (amongst other factors the difference in availability of child care).

3.3.3 Normative Backing of Marriage

The normative backing of marriage hypothesis assumes that when marriage enjoys strong normative support, and is and backed by religious institutions, such as the church, the likelihood of childbearing outside of marriage should be lower. A number of studies examinee the association of religiosity and non-marital fertility. More recent qualitative research also provides some insights into the societal meaning of cohabitation and marriage. Only very little research links attitudes in regards to marriage and actual demographic behavior. Most research that does so is limited to a description of changes in attitudes over time, or variation between countries (Liefbroer and Fokkema 2008; Gubernskaya 2010).

On the basis of country level vital statistics data Höpflinger (1985) observes a negative correlation between religiosity and non-marital fertility. Furthermore, he finds that Catholicism is negatively associated with non-marital fertility at the country level.

Similar evidence of a macro-level effect of religiosity is observed in the multilevel models run by Lappegård, Klüsener and Vignoli (2014). Of the four country level indicators employed in the multilevel models, significant effects can be observed for women's economic autonomy and religiosity.

When examining variation in non-marital fertility within regions of the Netherlands, Sobotka and Adigüzel (2002) find that religious attendance is a strong predictor of non-marital fertility ratios.

Vitali, Aassve and Lappegård (2015) study the diffusion of cohabitation in Norway from 1988 to 2012. Data at the municipal level is analyzed, and results provide evidence for the assumption that childbearing in cohabitation spreads over time and space. The authors find that religion has no part in the spread of childbearing in cohabitation, but that it does act as a boundary condition inhibiting non-marital fertility in some regions.

Liefbroer and De Jong Gierveld (1993) examine partnership planning intentions of young unmarried Dutch people on the basis of survey data. They find that more religious respondents are more likely to seek marriage over cohabitation. Furthermore, this study finds that both individual and peer group evaluation of different partnership forms is strongly associated with young people's plans for partnership formation.

Berghammer (2012), on the basis of Austrian GGS data, finds that individual religiosity negatively influences individual's likelihood of non-marital fertility, and that religious persons are significantly more likely to marry directly instead of cohabiting first.

Qualitative research from focus groups in 7 European countries inquired on the meaning of cohabitation and the social norms guiding it (Perelli-Harris and Bernardi 2015; Perelli-Harris et al. 2014). It is argued that the importance of religion for the decision to marry or cohabit is not direct, but much rather a factor that affects the social pressures on cohabiters. Another interesting finding from the focus group research in Norway (Lappegård and Noack 2015), one of the countries in Europe with the highest rates of childbearing outside marriage, is that there is no per se rejection of marriage. However, neither is there any perceived normative pressure to marry if one has a child.

Overall, I find considerable evidence for a negative association between religiosity and non-marital fertility. The majority of this evidence comes from aggregate analyses, either at the country or regional levels. Whether this link is indirect, i.e. norms affecting behav-

ior through potential sanctions (Perelli-Harris and Bernardi 2015), or direct, i.e. personal preferences (Berghammer 2012), remains unclear however.

3.3.4 Gender Equality

There is a considerable lack of research which empirically examines the associations between gender roles and childbearing outside of marriage. One notable exception is a recent article by Lappegård, Klüsener and Vignoli (2014) which employs an aggregated attitudinal measure in a multilevel design. Support for the statement "men should have preferred access to jobs if these are scarce" is aggregated to the country and regional level from social survey data. Of the four macro-level covariates, employed in this study, this variable shows the strongest effect in predicting the marital status of mothers at the time of childbirth. As the gender equality hypothesis predicts, the observed effect is positive, i.e. in context with higher approval of women working, mothers are more likely to cohabit at time point of childbirth.

A few studies from the United States examine the association between gender role attitudes and marriage. For example, Sassler and Schoen (1999) find that more traditional gender roles are associated with higher likelihood of transition to marriage, but more so for women than for men. On the other hand a study by Carlson, McLanahan and England (2004) did not observe any effect of gender roles on transitioning into marriage after a non-marital birth for fathers or mothers.

3.3.5 Uncertainty

The uncertainty hypothesis assumes that insecure economic circumstances will have a detrimental effect on the likelihood of having a child in marriage. It is expected that insecure labor markets have both an indirect effect, via the perceived future uncertainty, as well as a direct effect, when parents are affected by unemployment themselves. I assume that the micro-level effect of individual unemployment experience should be particularly pronounced for fathers.

A very interesting comparative study by Kalmijn (2011) attempts to test the ideas proposed by Oppenheimer in the European context. However, this analysis does not consider marriage status at time point of childbirth, but instead examines transitions to marriage relative to cohabitation and transitions from cohabitation to marriage. Kalmijn examines men's economic position which is assessed via unemployment, work experience, income and temporary employment. He finds that all of these factors influence men's union formation. A particularly interesting finding is that uncertainty constitutes more than only the effect of less income, as there is a net effect of unemployment after controlling for income. Furthermore, Kalmijn finds that uncertain economic position of men has a negative effect on transition into partnership, but this effect is far more pronounced for marriage than for cohabitation.

Lappegård, Klüsener and Vignoli (2014) in their multilevel analysis of childbearing in cohabitation test the effect of country and regional level unemployment rates on the likelihood of living in a non-marital birth. They observe no effect for the country level

unemployment rate but find that the effect of within country variation in unemployment is in accordance with the uncertainty hypothesis.

Vitali, Aassve and Lappegård (2015) employ a spatial model to study diffusion of cohabitation in Norway from 1988 to 2012. Data at the municipal level are analyzed and indicate that male unemployment rates are positively associated with regional patterns of childbearing in cohabitation.

Štípková (2015) examines causes for rise in non-marital fertility in Czech Republic. She utilizes multilevel models which employ birth register data. She finds evidence that economic insecurity, operationalized via the unemployment rate at the country level, increases the likelihood of birth outside of marriage for women with medium and low levels of education. No effect is observed for highly educated women however.

3.3.6 Summary

In conclusion I find considerable evidence in support of the status attainment hypothesis. However, most studies merely examine the effect of education and consider few other indicators which could be considered in light of this hypothesis.

For a number of countries studies also find evidence for an independence effect of mothers' education. However these findings do not necessarily confirm with my assumptions about the contextual effect. The two articles by Konietzka and Kreyenfeld (2002; 2005) do offer some evidence for an independence effect of female employment however.

In regards to the normative backing of marriage hypothesis, I find considerable evidence for a negative association between religiosity and childbearing outside of marriage. The studies presented here find associations for individual religiosity, as well as for aggregate level religiosity at different levels of abstraction. Only very little research specifically examines the association between attitudes on marriage and non-marital fertility.

In regards to the gender equality hypothesis there are only very few studies which consider the association between gender roles and childbearing outside of marriage. The few findings presented above are not overly conclusive.

The evidence for the uncertainty hypothesis is equally scant. Some evidence for a positive association between unemployment and non-marital fertility is reported but it is far from conclusive.

The fact that there is only little empirical evidence for a number of my hypotheses can be interpreted from two different perspectives. For one, a lack of research findings indicates that perhaps no such association exists. The other perspective would argue that the hypothesized associations are understudied, and thus examining them is a worthwhile exercise. The research design implemented in Chapter 4, differs from the methods commonly used in this field of research in sociology and demography, and thus allows a different perspective on non-marital fertility. In a first step associations shall be examined on the basis of country level data in time-series cross-section analysis.

4 Analysis

This chapter presents the results of the multivariate analysis which tests the hypotheses outlined in Chapter 2. The analysis is subdivided into two largely separate blocks. In Section 4.1 the results of country level analysis which employs time-series cross-section (TSCS) regression models and studies data from 1981 through 2010. The non-marital fertility ratio serves as the dependent variable in this analysis. It provides a long-term perspective on the development of non-marital fertility in Europe, and examines which social changes can be seen as chiefly responsible for increases in non-marital fertility. Section 4.2 presents result of multilevel regression analysis which examines parents' marital status shortly after the birth of a first child. These models are specified on the basis of microdata from the cross-sectional EU-SILC. For this analysis data for the years 2004 to 2012 are pooled. This microdata is supplemented by a number of country level indicators. The focus of this analysis is placed on couples, and it considers both mothers' and fathers' socioeconomic resources. This analysis places major emphasis on the contextual nature of decision making, which is explored by specifying models for different country groups, and by specifying random slopes and cross level interaction effects. The aside in Section 4.2.7 studies single mothers and compares them to cohabiting and married mothers.

By combining two different methodological approaches, one which takes on a longitudinal perspective and one which is strictly comparative, I hope to gain a better understanding of non-marital fertility in Europe. This combination of perspectives is an attempt at triangulation, in the hopes that the findings from these two separate analyses can validate each other. However, this objective is complicated by the fact that the dependent variables in both parts of the analysis are not fully congruent.

4.1 Macro-level Analysis

The aim of this country level analysis is to study changes in non-marital fertility in Europe since the early 1980s, in order to understand how this development can be situated in large scale societal changes. In particular, this analysis aims to shed light on how broader societal trends, such as women's labor market integration, increasingly volatile labor markets, and value changes have reshaped the relationship of marriage and childbearing in Europe. The choice to restrict this research to the macro-level was made consciously, in order to complement the multilevel models presented in Section 4.2, which are unable to study long-term developments in non-marital fertility in Europe. The dataset employed in this analysis incorporates country level data from a wide range of sources, and includes data for 27 European societies and includes data from 1981 to 2010. The analysis will employ time-series cross-section regression analysis (Fortin-Rittberger 2014).

The remainder of this chapter is structured as follows: In Section 4.1.1 I will provide a short overview of hypotheses and discuss their operationalization. Section 4.1.2 discusses the data employed, and provides some descriptive statistics. As time-series cross-section data tend to have a number of issues, which possibly violate basic assumptions of regression analysis I test for such violations in Section 4.1.3, and provide some information on the employed methodology. Section 4.1.4 then presents the results of the multivariate

analysis. In Section 4.1.5 I perform a number of regression diagnostics, Section 4.1.6 summarizes my findings and concludes.

4.1.1 Hypotheses and Operationalization

In Chapter 2 I outlined a number of hypotheses which propose macro-level effects. These hypotheses shall be tested as part of this analysis. I will outline them here shortly, and describe the indicators used to operationalize them, and the reasoning behind selecting specific indicators.

The percentage of live births to unmarried mothers, commonly referred to as the non-marital fertility ratio, will be employed as the dependent variable in this analysis. While the focus of this thesis is placed on childbearing in cohabitation, aggregated official statistics on the prevalence of births to cohabiters are not widely available. As the key objective of this analysis is to provide a more long-term and comparative perspective on the development of childbearing outside of marriage in Europe, data availability is a major consideration in selecting indicators for this analysis. Based on this reasoning, the non-marital fertility ratio is the best indicator for studying the development over time, as data is available for most countries in Europe from 1960 onwards. Section 3.1 provides an overview of the development of the non-marital fertility ratio in the different parts of Europe.

The economic independence hypothesis assumes that when women's position in the labor market improves, they should be less economically dependent on their spouse, and thus marriage as an insurance mechanism should become less important. The female labor force participation rate will be employed here as an indicator of women's financial independence, as a high rate of working women indicates that they have ample opportunities to fend for themselves economically. This indicator is a fairly crude measure, as it does not consider whether employment is full-time or part-time. Indicators such as mothers' employment might be more appropriate, but such data are not available for extended periods of time for all countries of Europe. Furthermore, the comparison of macro-level indicators in Chapter 3.2 showed that at the country level women's employment and maternal employment are highly correlated.

The uncertainty hypothesis assumes that marriage is a long-term investment, which individuals might seek to avoid when faced with planning insecurity. The degree of uncertainty faced by young parents shall be operationalized via the unemployment rate. The reasoning being that unemployment does not only hurt those directly affected, but also shifts the bargaining power of employees and employers in favor of the latter (Silver 2003), leading to more unstable employment relations and higher risk of job loss.

The normative backing of marriage hypothesis assumes that societal support for the institution of marriage will act as a disincentive for parents to have a child outside of marriage. In order to measure societal support for marriage two indicators are employed. For one, an attitudinal measure which assess the percentage of the population who agree with the statement "marriage is an outdated institution." The main issue with this indicator is that it is not available before the 1990s, and thus can only be employed for a subset of the data. The second indicator employed to test the normative backing of marriage hypothesis is a measure of church attendance. This indicator has the disadvantage of being an indirect measure of the concept, as it assumes that the importance of religion within societies

should be associated with support for institutions such as marriage. However, considering that all Christian churches in Europe propagate marriage as the preferred institution for family life, this choice of indicator appears plausible. As Section 3.3 showed, indicators of religious attendance are employed in a number of previous studies, which often find positive associations with measures of childbearing outside marriage.

The gender equality hypothesis assumes that value changes are the key factor responsible for explaining changes in the relationship between the sexes, the rise of new partnership forms, and increases in rates of childbearing outside marriage. As this hypothesis builds strongly on changes in attitudes, it was deemed appropriate to employ an indicator which measures attitudes on women's and particularly mothers' position in the labor market and society. The gender roles attitudes indicator, introduced in Chapter 3.2, serves this purpose, and will be employed here. The gender equality hypothesis should be seen as competing with the independence hypothesis, and thus it will be interesting to see if aggregated attitudes on gender relations are of relevance after controlling for women's economic participation in society.

4.1.2 Time-Series Cross-Section Data

The dataset employed in this analysis incorporates country level data from a wide range of sources and includes data on 27 European societies for the timespan from 1981 to 2010. As much of the data collected is not available before 1990 for former communist countries, the dataset is unbalanced. In sum 600 observations are included (an average of 22.2 per country). The longest time-series spans 30 years (Finland and Greece) and the shortest includes 12 observations (Cyprus). I will provide a short overview of the employed variables, before examining some descriptive statistics. Appendix A includes additional technical information on the individual variables and their operationalization.

Data on the non-marital fertility ratio are from Eurostat's dissemination database. Per capita gross domestic product, converted at "Geary-Khamis" purchasing power parities in 1000 1990 US $, will be included as a control variable. The data was taken from the Conference Board Total Economy Database. The unemployment rate and the female labor force participation rate come from ILO's KILM database. Data on religious participation, measured as percentage of population attending church weekly, come from a wide range of comparative surveys (Eurobarometer, WVS, EVS, ISSP and ESS). Attitudinal data on the percentage of population agreeing with the statement 'Marriage is an outdated institution' was generated on the basis of the European Value Study, as was the gender role attitudes index, which I detailed in Section 3.2. Missing values in time series are imputed via arithmetic mean substitution. In order to remove sharp trends from the church attendance data, five year rolling means are calculated.

Since data on the attitudinal indicators 'marriage is an outdated institution' and gender role attitudes are not available for all years under study, additional models are specified which run on a subset of the data. Descriptive statistics by country can be found in Table A.2 of Appendix B for the years 1986, 1996 and 2006. Table 4.1 provides an overview of

the relationships between the variables included expressed as Pearson correlation coefficients. Additionally it includes the between and within standard deviation for all variables.[19]

Table 4.1 Correlations and standard deviations for TSCS variables

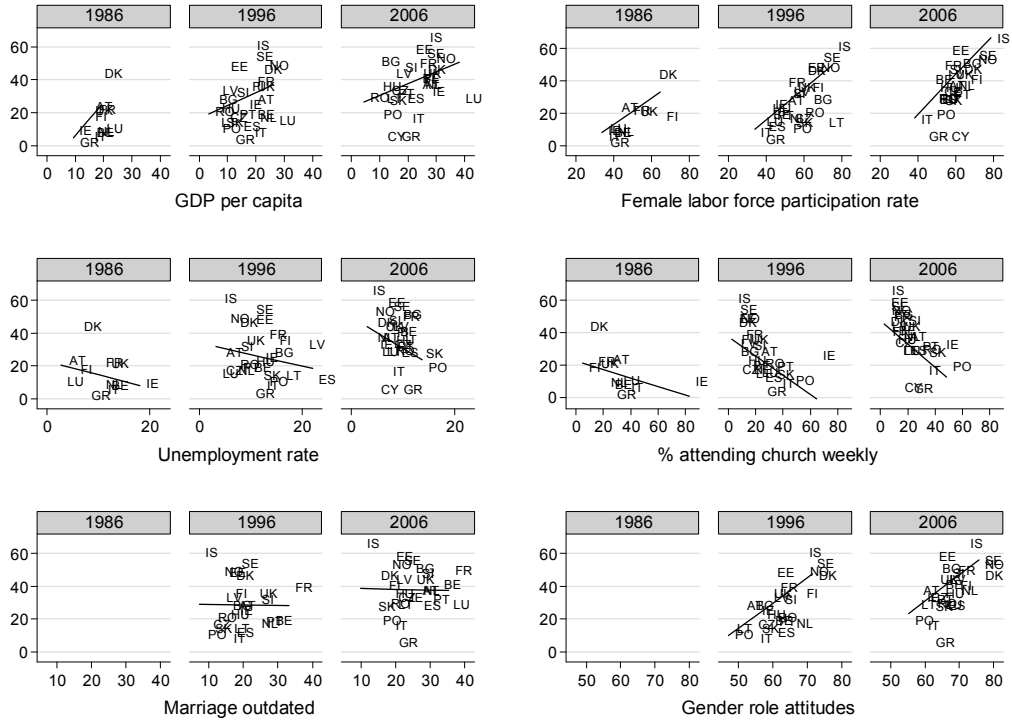
								Standard deviation	
		(1)	(2)	(3)	(4)	(5)	(6)	between	within
Non-marital fertility ratio	(1)	1.000						14.9	7.8
GDP per capita	(2)	.396	1.000					6.1	3.3
Female labor force participation	(3)	.755	.205	1.000				9.6	4.0
Unemployment	(4)	-.238	-.485	-.247	1.000			3.5	2.7
Church attendance	(5)	-.566	-.223	-.583	.298	1.000		14.6	4.3
"Marriage outdated"	(6)	.103	.431	-.270	-.160	-.098	1.000	6.5	3.1
Gender role attitudes index	(7)	.706	.528	.577	-.345	-.562	.150	5.8	3.2

A look at the standard deviation between and within countries reveals that data are rather slowly trending. All variables examined show larger degrees of variation between countries than over time. This difference is most pronounced for the female labor force participation rate and church attendance. Examining the correlations between the non-marital fertility ratio and dependent variables gives a first indication whether the hypothesized associations can be observed in the data. However these correlation coefficients can only gauge variation between units and not over time. To further illustrate these associations, and to examine whether they are stable over time Graph 4.1 provides scatterplots of bivariate relationships of non-marital fertility and the employed dependent variables for the year 1986, 1996 and 2006.

The control variable GDP per capita shows a moderate positive association with the non-marital fertility ratio. Examining the scatterplots of GDP and non-marital fertility in Graph 4.1, I observe a positive association in all three time points. However I also observe some clear outliers. Some of which have very low rates of non-marital fertility such as Greece, Cyprus or Italy, and others which have very high rates of non-marital fertility such as Iceland, Sweden or Estonia. Also Luxembourg due to it's extremely high GDP, seems to be a bit of an outlier as well. Of all the independent variables employed in the model the female labor force participation rate shows the clearest association with the non-marital fertility ratio, and as predicted this association is positive. A look at the scatterplots indicates that the association seems to be stable over time, and that both rates increase simultaneously. For the unemployment rate, theory predicts a positive association with non-marital fertility. However, the correlation coefficient is actually negative. A look at the scatterplots indicates that this association is stable over time. Due to the fact that the unemployment rate fluctuates so strongly over time, these scatterplots should not

19 Between standard deviation indicates the degree of variation among countries while within indicates variation over time.

be over interpreted, however. Examining the association between church attendance and non-marital fertility I observe a clear negative correlation, as suggested by the normative backing of marriage hypothesis. This association seems to be consistent over time. For 1986 and 1996 Ireland appears to be a clear outlier. The other variable associated with the normative backing of marriage hypothesis, the percentage of population agreeing with the statement "marriage is an outdated institution," shows no association with the non-marital fertility ratio. In line with the gender equality hypothesis, the gender role attitudes index looks to be closely linked to the proportion of births outside marriage, a finding evidenced by the strong correlation and the clear association in the scatter plots. I find some outliers here, however, with Greece and Estonia being the most prominent.



Graph 4.1 Scatterplots of non-martial fertility and TSCS independent variables

Examining the relationships among the independent variables, I observe that GDP is highly correlated with a number of other explanatory variables, most notably the gender role attitudes index (.528). This indicates that the economic advancement of society is closely linked with the equality of the sexes. I also observe a moderate positive correlation between agreement with the statement "marriage is an outdated institution" and GDP per capita. In turn, I also observe a strong negative correlation between unemployment and GDP per capita, which isn't overly surprising, as less people in unemployment should equate to higher productivity per capita. Three variables that seem to be closely linked to each other are the female labor force participation rate, church attendance and gender role attitudes. Church attendance is negatively associated with both female labor force participation (-.583) and gender role attitudes (-.562). The sizeable correlation between female labor force participation and gender role attitudes (.577), is not overly surprising, as the items included in the gender role attitudes index all relate to women's role in the labor market.

4.1.3 Method and Model Specification

The following analysis will conduct regression analysis on the basis of a time-series cross-section (TSCS) dataset.[20] The underlying methodology was developed primarily in political sciences, with Beck and Katz being the most vocal proponents of the methodology (Beck and Katz 1995, 2011). Essentially, methods developed for the analysis of panel data are applied to analysis of N macro-level units (i.e. countries) over t time points (i.e. years). The key advantage of this methodology is that variation over time and between units can be analyzed. However, TSCS models also come attached with a number of statistical challenges which will be addressed in the following section.

While time-series cross-sectional designs provide many advantages for analysis, they are not without problems. TSCS data often violate some of the basic assumptions of regression analysis. Procedures have been developed to deal with these issues, but issue need to be identified and then corrected for (Wilson and Butler 2007). I will provide a short overview of the tests run on the data, where the employed data violate basic assumptions, and discuss which steps have been undertaken to correct for these violations.

Serial correlation is present when the errors within units are correlated over time. This tends to be a major problem in pooled TSCS analysis, and particularly when slowly trending (sluggish) variables are included in an analysis. Due to the unbalanced nature of data Stata's xttest1 procedure (Sosa-Escudero and Bera 2008) is used to assess serial correlation. It confirmed with high significance that serial correlation is present within the data. A Lagrange Multiplier Test came to similar conclusions. There exist a wide range of strategies for coping with serial correlation, most of which propose some form of dynamic specification. Following advice from Beck and Katz (2011) models are specified with lags of the dependent variable.[21] From a theoretical perspective, the inclusion of lags of the dependent variable is also sensible, as a key assumption of this research is that societal context shapes

20 For a comprehensive introduction to the method see Fortin-Rittberger (2014).

21 This however invites the so called Nickel bias, which leads to overestimation of standard errors. Beck and Katz (2011) argue that this bias is particularly large for studies with small t and negligible for studies with large t. The time series used here are on average relatively long (average t

the decision making processes of individuals. The decisions made by persons in similar situations in the recent past, shape the context of individual decisions in the present, as they give an indication of social acceptability of the different options. The assumption that the non-marital fertility ratio in a given year is independent of the non-marital fertility ratio in previous years would be rather nonsensical. After the inclusion of a lag of the non-marital fertility ratio the model still showed considerable autocorrelation, however. Following advice by Reibling (2013), lags are specified through down testing of the lag structure. Comparisons of AIC and BIC for models with a varying number of lags of the non-marital fertility ratio show that a specification with four lags was vastly superior to one with three but almost identical to one with 5 lags. This led me to choose a specification which includes 4 lags of the dependent variable. Lags of the independent variables are not considered, as a number of short time-series are included in the analysis, and I wanted to avoid losing additional cases. In order to test whether the chosen specification can cope with autocorrelation, a further Lagrange Multiplier test was run. This test showed that errors are not autocorrelated in the specification with four lags (LM $chi^2(4)=6.0$).

Another common problem of TSCS datasets is panel heteroskedacity. Presence of panel heteroskedacity implies that the error variance differs across cross-sectional units due to characteristics of the units. With an unbalanced panel, such as the one at hand, a modified Wald test for groupwise heteroskedasticity (implemented in the Stata command xttest3) can be used (Baum 2001). The test indicates that heteroscedacity is present within the data. A common solution to the issue of heteroskedacity is to estimate some form of robust standard errors, so as to not overestimate confidence of findings. As they were developed specifically to tackle such issues, panel corrected standard errors (Beck and Katz 1995), which are implemented in Stata's xtpcse command, will be employed here.

A further issue in TSCS datasets with many time points can be cross-sectional dependence. This is also often referred to as contemporaneous correlation. The problem here is that residuals are correlated across countries, for example due to common shocks. For the given dataset, the Pesaran's test of cross-sectional independence (Stata command xtcsd) which is suited to examining unbalanced panels (De Hoyos and Sarafidis 2006) indicates that cross-sectional dependence over panels is of no concern.

A further core assumption of TSCS models is that data are stationary, i.e. that trends can fluctuate upward or downward over time, but return to a mean value. An augmented Dickey–Fuller test (Fisher) for unit root shows that with the exception of the unemployment rate, all variables exhibit some unit root. In order to examine in how far unit root is a problem for estimation, I followed advice proposed by Beck (2008) and regressed residuals on their lags. I observed no values close to 1 for the lags which indicates that unit roots are not a major concern within the data.

A further important model specification is the choice between a random or fixed effects model. Clark and Linzer (2015) suggest that the choice between random and fixed effects should be based on the size of the dataset, the correlation between predictors and the unit effects, and the degree to which the data is stationary, i.e. includes sluggish variables. For datasets with characteristics similar to those exhibited by this dataset (fairly large number

of 22.2 years), but are noticeably shorter for some countries. For the second set of models which are run on a smaller subset of data Nickel bias might be an issue.

of N and t, larger degree of variation between than within panels, and at least some correlation between independent variables and unit effects) they clearly recommend the application of fixed effects on the basis of Monte Carlo simulation results. Since a considerable degree of heterogeneity can be observed in the data, and the results of a Hausman test also indicate that a fixed effects specification is superior to a random effects model, country dummies are included in all models.

4.1.4 Time-Series Cross-Section Analysis

The analysis presented here is conducted at the country level and employs time-series cross-section regression analysis with the non-marital fertility ratio serving as the dependent variable. OLS regression models with panel corrected standard errors (Beck and Katz 1995/2011) are estimated using Stata's xtpcse command. Results displayed here include four lags of the dependent variable and country fixed effects (not shown). Table 4.2 shows beta coefficients and standard errors (in parentheses) for the base model. Table 4.3 displays results for the extended model which is run on a subset of the data. Due to the chosen specification, beta coefficients should be interpreted as follows: if the independent variable increases by one unit over time for a given country, the non-marital fertility ratio increases by beta percentage points. For the female labor force participation rate and the unemployment rate, a one unit increase corresponds to a 1 percent increase in the respective rate. For church attendance, a one unit increase corresponds to a 1% increase in the percentage of population attending church weekly. For the "marriage outdated" indicator it corresponds to a 1 percentage point increase in percentage of population agreeing with the statement "marriage is an outdated institution." Gender role attitudes are calculated as a composite index on the basis of three attitudinal indicators with scores ranging from 0 to 100. Scores of 0 indicate that average respondents in this country choose the most traditional attitudes for all questions while scores of 100 correspond to the most egalitarian evaluation on all items. Due to the inclusion of a lagged dependent variable, R^2 approaches values of 1 in all models and is thus not shown here.

Model 1 includes the first through fourth lag of non-marital fertility, as well as the control variable GDP. As one would expect based on the bivariate correlation, the coefficient for GDP is positive. However, no significant effect can be observed. In model 2, which additionally includes the female labor force participation rate, the effect of GDP reverses but stays insignificant. However, a significant positive effect for the female labor force participation rate can be observed. This effect slightly increases after introducing the unemployment rate in model 3. For the unemployment rate, the predicted positive effect on non-marital fertility can be observed. This comes as a bit of a surprise, as the bivariate correlation of these two variables was negative. However, due to the chosen model specification the effect observed here is the effect of a change over time in the unemployment rate. Model 4 tests the normative backing of marriage hypothesis by including a measure of church attendance. No significant effects can be observed in this model, and no substantial changes in any of the other predictors can be observed.[22] Model 5 which excludes

22 As a slight curvature can be observed in the scatterplots of church attendance and non-marital fertility, I also tested some alternate specifications. However neither the introduction of a qua-

the female labor force participation rate observes the predicted significant effect for church attendance, however. From a statistical perspective, this is not overly surprising as church attendance and women's labor market integration are strongly correlated. Thus, it appears that while religiosity seems to play a role in the development of non-marital fertility, these changes actually play second fiddle to changes in women's role in the labor market. As modernization theory would predict, these changes appear to be closely linked.

Table 4.2 TSCS regression base model results

	m 1	m 2	m 3	m 4	m 5
Lag of non-marital fertility ratio	1.183** (0.064)	1.147** (0.063)	1.129** (0.062)	1.129** (0.062)	1.160** (0.063)
2nd Lag of non-marital fertility ratio	-0.034 (0.105)	-0.025 (0.102)	-0.015 (0.101)	-0.016 (0.101)	-0.027 (0.103)
3rd Lag of non-marital fertility ratio	0.101 (0.106)	0.113 (0.103)	0.128 (0.101)	0.128 (0.101)	0.115 (0.103)
4th Lag of non-marital fertility ratio	-0.268** (0.064)	-0.252** (0.062)	-0.259** (0.061)	-0.257** (0.061)	-0.264** (0.063)
GDP per capita	0.017 (0.015)	-0.024 (0.017)	-0.015 (0.018)	-0.018 (0.018)	0.004 (0.018)
Female labor force participation		0.048** (0.011)	0.052** (0.011)	0.050** (0.012)	
Unemployment			0.041** (0.011)	0.041** (0.011)	0.039** (0.011)
Church attendance				-0.005 (0.010)	-0.024* (0.010)
Constant	0.603** (0.228)	-0.499 (0.316)	-1.144** (0.379)	-0.939 (0.579)	0.903* (0.454)

Beta coefficients and standard errors ; * $p < .05$, ** $p < .01$; N=600; Country fixed effects not shown

In conclusion, the findings from these models lend support to both the independence and uncertainty hypothesis, while rejecting the normative backing of marriage hypothesis. Table 4.3 includes additional models estimated on a subset of the data. These models will further explore the normative backing of marriage and the gender equality hypotheses. As the attitudinal data included in these models is not available previous to the 1990s, these models are estimated with a subset of the data, and such are not strictly comparable with the results from Table 4.2. Results displayed in Table 4.3 only include 488 cases from 1990 onward and omit Cyprus.

Model 6 replicates model 4 from table 4.2 and the results are fairly consistent. Again no significant effect can be observed for church attendance. I do find significant positive effects for both the unemployment rate and the female labor force participation rate. Model 7 includes the percentage of people agreeing with the statement "marriage is an outdated institution," which is intended as a further test of the normative backing of mar-

dratic term, nor using the natural log of church attendance changed the substantial results observed here. Thus the simple linear estimation is used for ease of interpretation.

riage hypothesis. As the descriptive statistics above indicated, no significant effect can be observed. This finding is also at odds with the normative backing of marriage hypothesis.[23] Model 8 includes gender role attitudes for which a significant and positive effect can be observed. This finding is in line with the gender equality hypothesis. When examining how the inclusion of gender role attitudes affects other variables, I find that the effect of the unemployment rate has slightly decreased. Furthermore, with the inclusion of gender role attitudes, the effect of GDP has increased considerably and is now significant at the .05 level. Apparently, gender role attitudes mediate the effect of GDP on non-marital fertility.

Table 4.3 TSCS regression extended model results

	m 6	m 7	m 8	m 9
Lag of non-marital fertility ratio	1.130** (0.067)	1.114** (0.068)	1.094** (0.068)	1.125** (0.069)
2nd Lag of non-marital fertility ratio	-0.040 (0.105)	-0.041 (0.104)	-0.042 (0.103)	-0.051 (0.105)
3rd Lag of non-marital fertility ratio	0.139 (0.104)	0.141 (0.103)	0.140 (0.102)	0.132 (0.105)
4th Lag of non-marital fertility ratio	-0.243** (0.066)	-0.243** (0.065)	-0.238** (0.064)	-0.247** (0.066)
GDP per capita	-0.029 (0.023)	-0.039 (0.023)	-0.058* (0.025)	-0.030 (0.025)
Female labor force participation	0.043** (0.015)	0.044** (0.014)	0.053** (0.015)	
Unemployment	0.041** (0.013)	0.039** (0.013)	0.037** (0.013)	0.039** (0.013)
Church attendance	0.000 (0.013)	0.005 (0.013)	0.003 (0.013)	-0.020 (0.013)
"Marriage outdated"		0.049* (0.023)	0.031 (0.023)	0.034 (0.023)
Gender role attitudes index			0.067** (0.019)	0.050** (0.018)
Constant	-0.372 (0.795)	-1.288 (0.847)	-4.348** (1.034)	-1.631* (0.805)

Beta coefficients and standard errors ; * $p < .05$, ** $p < .01$; N=488; country fixed effects not shown

A theoretically informed ad-hoc explanation could read as follows: The effect of GDP on non-marital fertility is twofold and contradictory. On the one hand, higher levels of GDP are likely to be associated with higher levels of planning security for individuals, due to a more intact economy, and more comprehensive and generous welfare regimes. In line with the uncertainty hypothesis, these higher levels of security would then be associated with

23 As including two indicators for the same concept might lead both to become insignificant, I also specified a model which does not consider church attendance. In this model, the effect of marriage outdated is slightly higher but not significant at the .05 level.

lower levels of childbearing outside marriage. On the other hand, as can be seen from the correlation between GDP and gender role attitudes, economic development is also associated with social development towards gender equality. After controlling for this development via the gender role attitudes indicator, the security effect of GDP comes to the fore in the form of a significant negative effect.

Additionally, the inclusion of gender role attitudes also leads to an increase of the effect of female labor force participation. From a theoretical perspective, this is rather interesting, as the gender equality hypothesis emphasizes that effects of gender role attitudes should be observable independently of women's economic integration. Not only can such an independent effect be observed, but apparently gender role attitudes actually mediate the relationship between female labor force participation and non-marital fertility. A look at model 9, in which I excluded female labor participation, shows that female labor force participation also mediates the effect of gender role attitudes, as the effect is now much less pronounced. Thus these two variables seem to reciprocally reinforce each other.

In order to better understand the relationship between female labor force participation, gender roles and non-marital fertility, a more detailed examination of the data is necessary. I examined whether the association between these variables differs across countries and regions. And in fact the data reveal that in post-socialist countries female labor force participation does not discriminate between countries with high and low rates of non-marital fertility to the same extent as it does in the other regions. While this finding could be attributed to the low levels of variation in female employment witnessed in Eastern Europe, it could also be interpreted substantially: i.e. where women's employment is not voluntary, but presents an economic necessity, it does not actually lead to increasing levels of female independence. However, running separate models for the Eastern European countries and all other countries, I find that the complementarity of female labor force participation and gender role attitudes can be observed in both groups.

When examining the three variables by country, it becomes apparent that in countries with both high levels of gender equality and female labor force participation rates of non-marital fertility tend to be highest. I also calculated the mean value of female labor force participation and the gender roles attitudes index. I find that this composite indicator is more strongly correlated with the non-marital fertility ratio than either variable individually. Thus it appears that the effects of female independence and value change towards gender equality are not so much competing but to a certain extent complimentary.

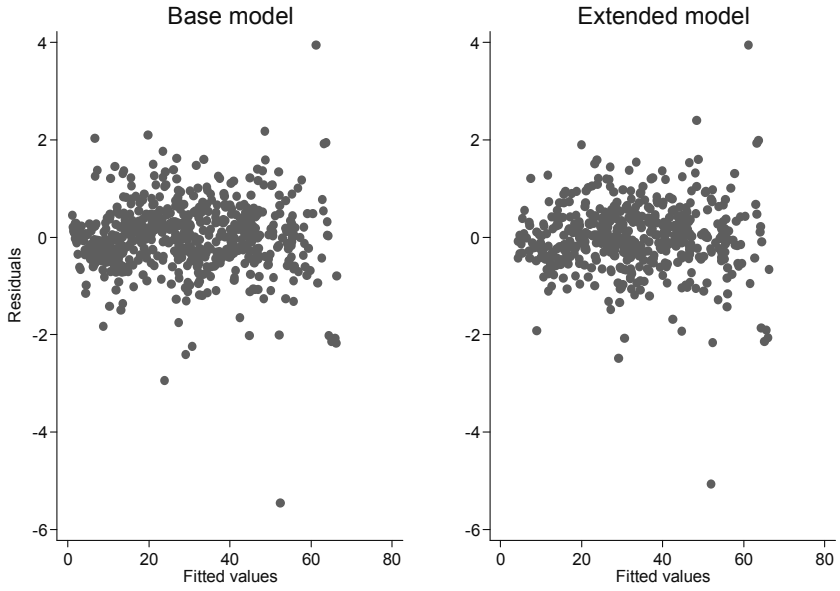
In conclusion, I will review these regression results in light of the proposed hypotheses. The results presented here support the independence hypothesis, as the female labor force participation rate shows the expected positive effect. Similarly, I find evidence in support of the uncertainty hypothesis as increases in unemployment lead to increases in non-marital fertility. This association would have not become evident on the basis of a country comparison as it seems to be driven primarily by intertemporal effects. A further finding of note in regards to the uncertainty hypothesis is the negative effect of per capita GDP on the non-marital fertility ratio, which becomes apparent after attitudes and women's labor force participation have been controlled for. While there is some indication that church attendance has an effect on non-marital fertility, the models indicate quite clearly that the effect of changes in church attendance play second fiddle to changes observed in work relations. Also, no significant effect can be observed for the attitudinal indicator "mar-

riage is an outdated institution." Thus, the normative backing of marriage hypothesis can be clearly rejected. Data also strongly support the gender equality hypothesis. Not only can the predicted positive effect for the gender role attitudes index be observed, but this effect remains strong even after controlling for female labor force participation. The fact that female labor force participation and gender role attitudes mediate each other was not anticipated, and it appears that these variables are more complementary than competing.

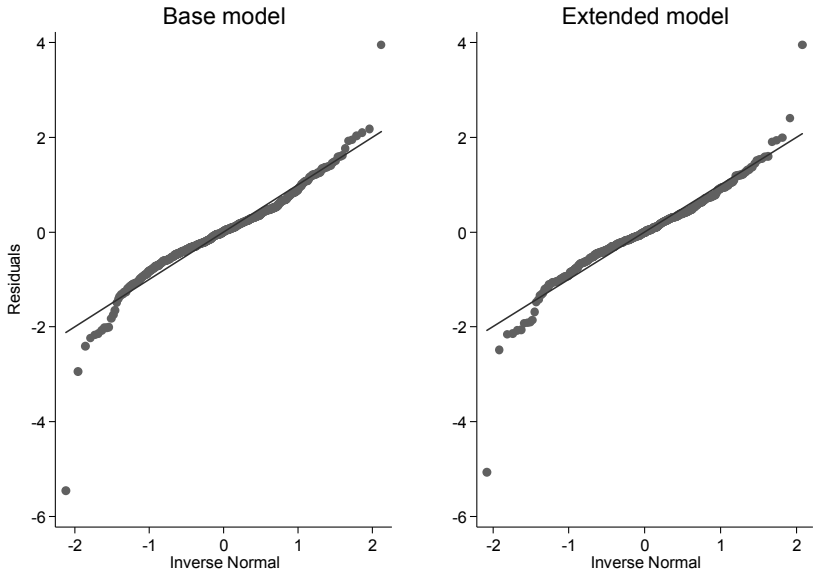
4.1.5 Model Diagnostics

It was previously mentioned in Section 4.1.3 that testing for autocorrelation via a Lagrange Multiplier (LM) test is important to determine whether the chosen model specification produces consistent standard errors. LM-tests for both the base and extended model showed that no significant autocorrelation of errors can be observed in either which is reassuring.

In a next step residuals are examined. The residual plots for the base and extended model shown in Graph 4.2 give the impression that residuals are normally distributed for both models. While I observe a few outliers, less than 2 percent of the residuals take on values greater than 2 or below -2 in both the base and extended model. A look at the Quantile-Quantile (QQ) plots in Graph 4.3 reaffirms the observation that residuals seem to be normally distributed. However, the slight upward slope at the top end of the graph and the more noticeable downward slope at the bottom of the graph indicate that the distribution of the errors has rather long tails.



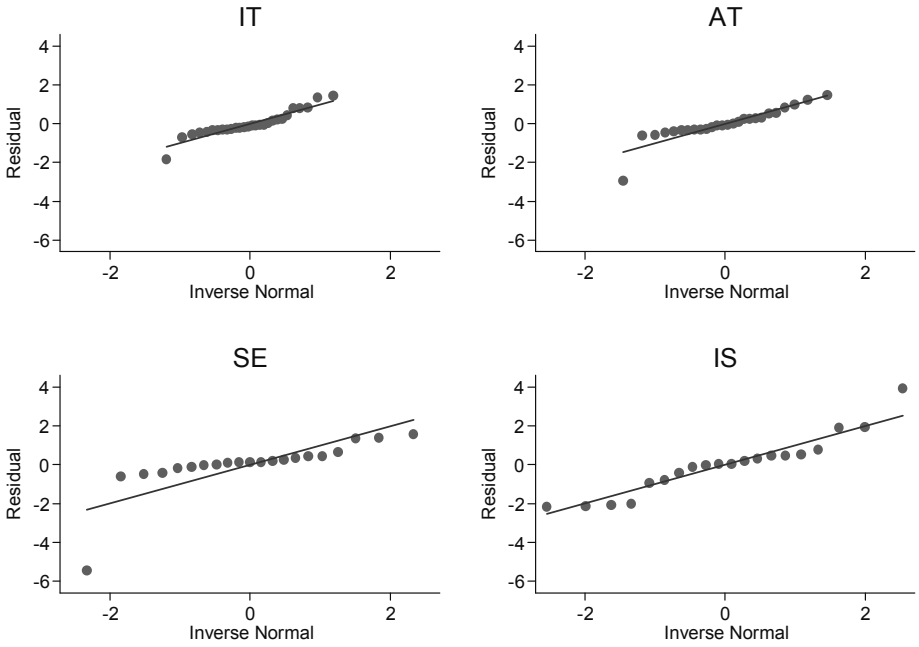
Graph 4.2 TSCS residual plots



Graph 4.3 TSCS QQ plots

In a next step, residuals are examined by country. I studied QQ plots for all countries, and those deviating from a normal distribution are shown in Graph 4.4 for the base model.[24] Of the four plots displayed that for Italy appears the least worrisome as a single outlier is causing a slight skew, but overall residuals appear to be normally distributed. Austria displays a similar pattern although slightly more severe. The residuals for Iceland are a bit off, but considering the small number of observations it still seems within bounds. The plot for Sweden looks rather problematic as it indicates a skewed distribution of residuals. However, this skew is the result of one outlier, the year 1990, which is the first year observed for Sweden. The rate of unemployment was under 2% in 1990 and then skyrocketed during the early to mid-nineties and never returned to such low levels again. I tested models which exclude this observation but as ultimately this did not affect overall model results I choose not to exclude this case.

24 Plots for the extended model are not shown, since the same countries appear to be problematic and patterns are very similar.



Graph 4.4 Base model QQ plots for selected countries

In order to assess the degree of country level heterogeneity, I reran both the base and extended model, leaving out one country at a time. I then use the estimated values to predict the non-marital fertility ratio in that country (Beck and Katz 2011). Table 4.4 shows the absolute prediction error (which is expressed as percentage points of non-marital fertility) from these models, as well as an adjusted measure which is calculated by dividing the absolute prediction error through the mean score of non-marital fertility for each country in the observed time periods. On average the sum of the absolute prediction error corresponds to .81 and .82 percentage points of non-marital fertility for the base and adjusted model respectively. The highest prediction errors in percent of NMF can be observed for Iceland, Sweden and Lithuania, all of which have high rates of non-marital fertility. For these countries an average error of slightly over 1 percentage point seems acceptable. In order to identify those countries for which the model fits least, a look at the adjusted measure reveals that for Greece and to a lesser extent Cyprus measures are considerably off target. While Cyprus is not included in the extended model, the error for Greece is even larger in the extended model. The third country for which estimates are fairly far off is Poland. Overall, while heterogeneity in prediction errors between countries appears to be fairly low, I observe estimation issues for those countries with low levels of non-marital fertility.[25]

25 In part this can be attributed to the linearity assumption implicit in the model. When respecifying the model with the logit of NMF as the dependent variable, the adjusted mean prediction error for GR and CY are still larger than for all other countries but to a much smaller degree than observed here.

Table 4.4 Mean prediction error by country

	Base model		Extended model	
	absolute	adjusted	absolute	adjusted
Austria	0.34	0.01	-0.64	-0.02
Belgium	-1.12	-0.05	-1.20	-0.04
Bulgaria	0.94	0.02	0.89	0.02
Cyprus	0.83	0.14	-	-
Czech Republic	0.54	0.02	0.63	0.03
Denmark	1.20	0.03	0.89	0.02
Estonia	0.63	0.01	-0.13	0.00
Finland	1.32	0.04	1.30	0.04
France	0.28	0.01	0.35	0.01
Greece	0.80	0.23	1.85	0.35
Hungary	0.44	0.01	0.73	0.02
Iceland	1.39	0.02	0.66	0.01
Ireland	-1.27	-0.05	-2.61	-0.09
Italy	0.31	0.03	0.40	0.03
Latvia	1.01	0.02	0.96	0.02
Lithuania	1.43	0.06	1.56	0.06
Luxembourg	-0.21	-0.01	-0.40	-0.01
Netherlands	0.27	0.01	0.53	0.02
Norway	1.13	0.02	0.89	0.02
Poland	1.18	0.08	1.26	0.09
Portugal	0.29	0.01	0.89	0.04
Romania	1.14	0.04	1.62	0.06
Slovakia	1.01	0.05	1.24	0.06
Slovenia	0.25	0.01	0.43	0.01
Spain	0.62	0.03	1.08	0.05
Sweden	1.37	0.03	1.24	0.02
United Kingdom	0.60	0.02	0.26	0.01
Mean Absolute Value	0.81	0.04	0.82	0.04

Post estimation analysis indicates that both the base and extended model fit the data reasonably well. However, one major issue appears to be that estimates are more imprecise in countries with low levels of non-marital fertility, specifically Greece and Cyprus. I will have to keep this in mind, and place additional focus on these countries in sections 4.2. From a substantial perspective post estimation analysis indicates that the employed indicators fail to fully comprehend the specifics of non-marital fertility in countries with very low levels of non-marital fertility.

4.1.6 Summary

On the basis of a country level time-series cross-sectional dataset, this analysis has attempted to shed light on four hypotheses specified in Chapter 2. I will first review results in the light of these hypotheses, before moving on to a critical discussion of hypotheses, methods and results. As this analysis considers only country level data none of these findings should be perceived as fully conclusive. Despite some very clear and also somewhat intuitive findings, establishing causality on the basis of macro-level associations is risky business, as the possibility of ecological fallacy and misspecification of theoretical concepts looms large. Instead, I see this research as an attempt at triangulation, to which the multilevel analysis in Section 4.2 will add an additional perspective.

The independence hypothesis, which is operationalized via the female labor force participation rate, can be clearly confirmed. For one, the bivariate association between the female labor force participation rate and the non-marital fertility ratio at the country level is strong. More importantly, as can be seen in all specified regression models, changes in the female labor force participation rate are positively associated with changes in the non-marital fertility ratio.

The uncertainty hypothesis is operationalized via the unemployment rate, and the assumption that changes in the unemployment rate are positively associated with changes in the non-marital fertility ratio can be confirmed. However, considering that no bivariate association can be observed, it is important to emphasize that this association only becomes apparent due to the dynamic specification chosen in the regression model. A further finding which could be interpreted in light of the uncertainty hypothesis, is the significant negative effect observed for GDP after controlling for gender role attitudes and female labor force participation in the extended model. I argue that GDP might include two contradictory effects. On the one hand, higher levels of GDP are associated with a post-materialist shift and a move towards gender equality. On the other hand, economic development also implies higher rates of existential security.

The normative backing of marriage hypothesis can be clearly rejected on the basis of this analysis. Neither the percentage of people attending church on a weekly basis, nor the proportion of population agreeing with the statement "marriage is an outdated institution" can predict changes in the rates of non-marital fertility. In the case of church attendance, for which a positive bivariate association is observed, I find that this correlation is likely spurious. Other factors, such as changes in women's role in the labor market, which occur simultaneously, are far more important to explaining changes in non-marital fertility ratios. This finding can be interpreted in light of secularization theories which see declines in religiosity as part of societal modernization processes. In this thinking, religion serves as a tool for individuals to rationalize their surroundings (Bruce 2000). But as existential security declines so does the role of religion as a tool to rationalize this insecurity (Norris and Inglehart 2011). By this logic, secularization is a byproduct of modernization processes. Changes in women's role in the labor market are another key aspect of this modernization process (Inglehart and Norris 2003). These changes are more important to the development of non-marital fertility than secularization processes. Hence, the effect of church attendance is overshadowed by that of non-marital fertility. It appears that the decision to have a child within or outside of marriage is not so much guided by changes

in salience of religious institutions, and the normative power they might have to enforce marriage, but much rather by changes in the role of women in society.

For the attitudinal indicator, agreement with the statement "it is okay to live together without being married," the evidence is even more obvious. Neither a bivariate nor a multivariate association can be observed between this indicator and the non-marital fertility ratio. This is likely due to the fact that agreement with this statement is low in the Nordic countries (see discussion in Section 3.2). Since the Nordic country group is also the region with the highest rates of childbearing outside marriage in the data. Thus, the implicit assumption formulated in the normative backing of marriage hypothesis that high levels of social support for marriage translates to high social pressure to marry before a child is born, cannot be confirmed.

A further finding which must be discussed in light of the normative backing of marriage hypothesis is the poor fit of the regression model for countries with low levels of non-marital fertility. Greece and Cyprus are extreme outliers in terms of non-marital fertility, but are not so different from the rest of Europe in regard to other indicators. The general intent of the normative backing of marriage hypothesis is to emphasize cultural factors which require parents to be married. In regards to both employed indicators these countries are not extreme outliers (or in the case of Cyprus no data is available for the marriage is outdated indicator). I believe it is the failure of the chosen specification to model the normative imperative to marry, which ultimately leads to a poor model fit for Greece, Cyprus and, to a lesser extent, Poland. A factor I could not consider here, due to the TSCS models' inability to consider time invariant covariates, is the religious heritage of a country.

The gender equality hypothesis, which is operationalized via the gender role attitudes index, can be confirmed. A strong bivariate relationship between gender role attitudes and non-marital fertility can be observed, and the regression models suggest that changes in gender roles are positively associated with changes in the non-marital fertility ratio. As hypothesized in Chapter 2, such an effect can be observed after controlling for women's economic situation within a country. Surprisingly, it appears that women's economic integration and gender roles are not so much competing but much rather complimentary predictors of non-marital fertility. My interpretation of this finding is that female labor force participation does not automatically imply women's emancipation. When women are required to be involved in the labor market for the family to make ends meet, this does not necessarily equate to independence. Similarly attitudes on gender roles might lead parents to forego marriage as they believe in an egalitarian division of labor, but such an egalitarian division of labor can only be practiced when the societal boundary conditions allow for it. Thus, labor force participation and gender roles in conjunction can better describe the move away from marriage as a family form.

4.2 Multilevel Analysis

In this section I present results of multilevel models which examine the marital status of parents with a single child under one year of age. The focus of the analysis is placed on the comparison of couples, who live in marriage or cohabitation. These models consider the socioeconomic resources of both fathers and mothers. Additionally, models are estimated

which compare single, cohabiting and married mothers. These analyses utilize microdata from the cross-sectional component of the European Statistics on Income and Living Conditions (EU-SILC). The analysis pools data for the years 2004 to 2012. I will estimate models which consider data for all countries simultaneously, and also specify separate models by country groups. These individual level data are complemented by four country level indicators. Namely: the gender role attitudes index, the childcare enrolment rate, the unemployment rate and the acceptance of cohabitation. These indicators are presented in sections 3.2 and 4.1.[26]

I chose a multilevel-modelling approach for this analysis, as it allows me to consider both the individual characteristics of parents and country level factors. In comparison to standard regression models, multilevel models consider the clustering of observations within higher level units. This leads to a more precise estimation of standard errors for higher level units. This analysis strategy allows me to examine the variation of individual level predictors between countries by explicitly modeling this variation via random slopes. By considering interactions between micro- and macro-level covariates, multilevel models can further improve our understanding of the variation between contexts. This aspect is of considerable importance for this study, as exploring whether the individual level predictors of marital status at the time of childbirth are dependent on context is one of the central objectives of this thesis. Specifically, the independence and status attainment hypotheses assume that the effect of individual level characteristics should vary between countries.

The remainder of this section will be structured as follows: In Section 4.2.1 I present the data employed in this analysis. Here I discuss my reasoning for choosing the cross-sectional EU-SILC as a data source, and which alternative datasets were considered. Section 4.2.2 outlines the operationalization of theoretical concepts, and discusses variables which I had initially considered for this analysis but which I chose to forego for one reason or another. Section 4.2.3 will present descriptive statistics for all variables employed in the analysis. Section 4.2.4 includes the results of multivariate models which consider only micro-level variables as well as random intercepts. Models presented in Section 4.2.5 additionally include country level variables, and model variation between contexts by introducing random slopes and cross-level interaction terms. In Section 4.2.6 a number of diagnostic tests are conducted. These tests evaluate the robustness of results. Section 4.2.7 includes a short aside on single mothers which compares single mothers to those living in partnership on the basis of multinomial multilevel models. Section 4.2.8 summarizes results and discusses the central findings.

4.2.1 Data

The hypotheses outlined in Chapter 2 posit certain requirements in regards to the employed microdata. At the micro-level, the most central theme is that of relative socioeconomic resources of parents. This implies that microdata must contain information on both fathers

26 Countries are used as level two units mainly due to data availability. However, as detailed in Section 3.3, previous research (Lappegård, Klüsener and Vigoli 2014) finds that variation between countries is far greater than variation between smaller geographical units such as regions.

and mothers. Additionally, due to the emphasis on parents' labor market position, data on employment histories should be available, in order to operationalize the independence and specialization hypotheses. Another key aspect of the proposed hypotheses is the contextual nature of decision making processes, which will be tested on the basis of multilevel models. These models have certain requirements in regards to the number of units at the macro-level. Most authors argue that 20 to 30 level two units at minimum are required in order to achieve robust results, especially if one is interested in cross level interactions (Maas and Hox 2005; Stegmüller 2013). As sections 3.1 and 3.2 have shown, there is considerable variation both in the levels of non-marital fertility and the social and economic boundary conditions throughout Europe. In order to fully capture this variation, an important requirement in regards to the microdata is that it includes outliers on both extremes, such as Greece and Cyprus on the lower end of the spectrum and Iceland, France or Eastern Germany at the other end. For these reasons a data source with broad geographic coverage was seen as essential. As it meets all my proposed criteria I choose to conduct this analysis on the basis of the EU-SILC. In the following I will provide some information on the EU-SILC, and also discuss alternative data sources which I considered for this analysis.

EU-SILC Microdata: Strengths and Limitations

The EU-SILC is a yearly data collection effort conducted by Eurostat in cooperation with European National Statistical Institutes. The EU-SILC is designed as an output harmonized data source. Eurostat specifies a set of target variables which must be contained in the microdata, and defines a set of quality indicators in regards to sampling and data collection. These criteria are laid out in the "Methodological guidelines and description of target variables," also commonly referred to as Guidelines (Eurostat 2013). On the basis of these recommendations, the National Statistical Institutes then independently carry out the collection of data. While in most countries the EU-SILC is devised as a sample survey, a number of countries utilize registers as well, particularly for income data. The countries employing registers include all Nordic countries: Denmark, Iceland, Finland, Norway and Sweden as well as the Netherlands and Slovenia (for a comprehensive overview see Jäntti, Törmälehto and Marlier 2013).

The EU-SILC is devised as a rotating panel from which a longitudinal and a cross-sectional dataset are produced (Eurostat 2013: p. 19ff.). Within this design each sampled household is usually surveyed for four subsequent years.[27] The EU-SILC was first carried out on the basis of a gentlemen's agreement in 2003 by Belgium, Denmark, Greece, Ireland, Luxembourg, Austria and Norway. The first regular survey was carried out in 2004 and to date 32 countries participate in the EU-SILC, this includes all countries of the EU-28 plus Iceland, Norway and Switzerland (Eurostat 2016).

The primary objective of the EU-SILC is to deliver comparative indicators on income, poverty and living conditions and to evaluate progress towards EU policy objectives (Eurostat 2013, p. 13). Furthermore, the EU-SILC User Database (UDB), a partially anonymized version of the microdata, is distributed to accredited researchers (Eurostat 2015), and has

27 There are exceptions to this rule. France for example employs a 6 year rotation and Norway employs and 8 year rotation scheme.

become a popular resource for comparative social research in Europe. Due to its thematic focus on income and poverty, most scholarly research conducted with the EU-SILC focuses on poverty, material deprivation (Lohmann 2009; Guio, Fusco and Marlier 2009; Whelan and Maitre 2013) and effects of social policy (Whelan and Maitre 2010, Cantillion 2011). Most of the research on families conducted with the EU-SILC examines issues such as child poverty (Bradshaw and Richardson 2009), child care provision (Nicodemo and Waldman 2009; Mamolo, Coppola and Di Cesare 2011), mothers' labor market integration (Erhel and Guergoat-Larivière 2013), and lone parents (Chzhen and Bradshaw 2012). However, studies focusing on fertility or family formation processes on the basis of the EU-SILC are somewhat rare (Aldieri and Paolo-Vinci 2012; Vignoli, Drefah and De Santis 2012; Baizán, Arpino and Delclós 2014).

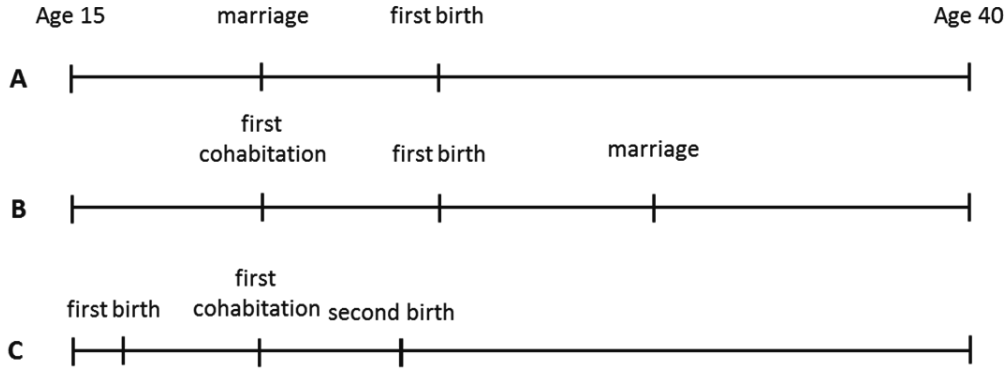
For the proposed research question the EU-SILC has a number of key advantages over other available data sources. However, it also has a number of shortcomings which I will discuss here as well. The big draw of European official statistics microdata for most researchers is the very large sample sizes and the comprehensive geographical coverage. The large sample sizes of the EU-SILC are a necessity for the proposed analysis, as it is limited to 'first births' in the year prior to the survey. As was detailed above, the broad geographical coverage is also important, to satisfy the demands of multilevel models in regards to the sample size at level two, and to better reflect the diversity in patterns of non-marital fertility throughout Europe. A further strength of the EU-SILC data is the detailed sociodemographic information provided for all household members. In particular, the information on employment in the previous calendar year is invaluable, as it allows me to assess the labor market orientation of new mothers. However, the fact that this information is only available for the year prior is also a limitation, as more extensive information on the labor force participation would be of even greater use.

A further issue in the EU-SILC data is the lack of distinction between biological and social parentage. However, limiting the analysis to parents of children aged one year or younger somewhat mitigates this problem (Laplante et al. 2015). A limitation of the EU-SILC, or any household survey for that matter, is that it only provides information on current household members and therefore no information on non-resident parents. As no information on fathers is available for single mothers, the analysis presented here will largely focus on the comparison of cohabiting versus married couples. A further data related limitation of the EU-SILC lies in the anonymization of regional subunits specifically in Germany where it is not possible to identify whether a surveyed household is located in Western or Eastern Germany. However, due to the vastly differing rates of non-marital fertility in both parts of Germany (Konietzka and Kreyenfeld 2005) it would make no sense to treat them as one unit for such an analysis. This is particularly annoying, as Eastern Germany is one of the cases with the highest rates of non-marital fertility in Europe, and thus would have been an extremely interesting case to consider in this analysis. Another issue for which the EU-SILC is often criticized is the quality and in particular the comparability of income data (Lohmann 2011; Iacovou, Kaminska and Levy 2012). This is due to the fact that NSIs are

allowed to collect income either net or gross, and that they are allowed to collect income data from either registers or surveys. Furthermore, no common methodology exists for imputing net from gross earnings and vice versa (Iacovou, Kaminska and Levy 2012).

Utilizing Cross-Sectional Data for Family Formation Processes

A rather severe limitation of the EU-SILC is that it does not contain any information on date of marriage. This makes it impossible[28] to ascertain a clear temporal ordering of marriage and childbirth. From a theoretical perspective, this is problematic as the explanatory variable of the analysis, marital status at the time of birth of the first child actually implies two separate processes: childbirth and marriage. Furthermore, as no information is provided on the date of marriage, the decision to marry might have taken place shortly before the birth of the child or 20 years prior. However, empirically (Baizán, Aassve and Billari 2003; Hoem and Kreyenfeld 2006) first births tend to occur only a few years after marriage, and marriage rarely occurs shortly after first birth (Blossfeld and Mills 2001; Huinink and Konietzka 2003; Baizán, Billari and Aassve 2004). Some authors even argue that these events can be seen as a single family formation process (Brien, Lillard and Waite 1999, p. 546; Baizán, Billari and Aassve 2003). While examining transitions is likely the ideal way of studying childbearing outside marriage, and the only way to establish causality, it places very high requirements on the data. Graph 4.5 below exemplifies such a data structure and a few idealized life courses with the relevant life events and their timing.

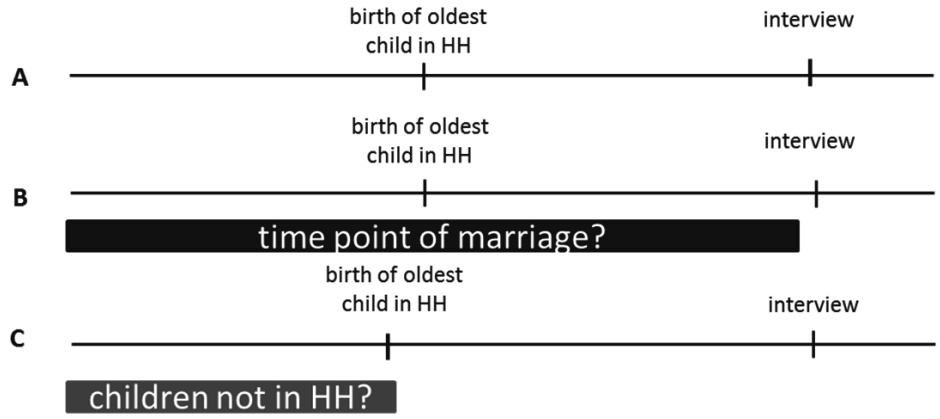


Graph 4.5 Transitions in longitudinal perspective

When utilizing cross-sectional data, one has far less information on the timing of events. While the date of birth of a child can often be calculated if children still live in the household, surveys often do not include any information on children living outside the household. Furthermore, few household surveys include information on the time of marriage or the start of a cohabiting union. Graph 4.6 below exemplifies such a data structure,

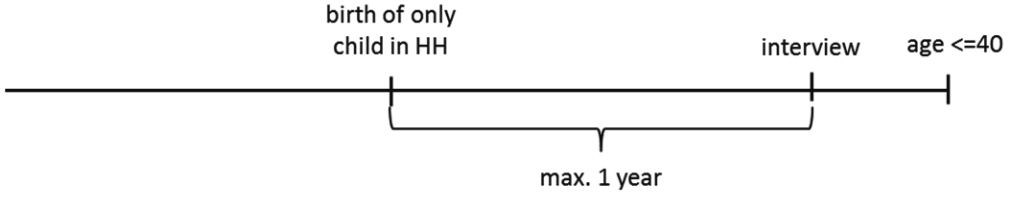
28 Employing the longitudinal component of the EU-SILC does offer some potential for reconstructing marriage histories. However, the short panel duration makes the longitudinal EU-SILC ill-suited for such an approach.

and highlights the issue of unknown timing of events based on the examples presented in Graph 4.5. Despite having very different life courses, the examples A and B appear equivalent in a cross-sectional perspective if only information on age of children living in households is available, and information on time of marriage is missing. While on the basis of the longitudinal timeline provided in Graph 4.5, one could examine the marital status of the exemplary mothers at the time of birth of the first child, and find that A was married and B was cohabiting this cannot be deduced from the information included in Graph 4.6. Case C highlights another issue: that of children who have already moved out of the household at the time of the interview.



Graph 4.6 Limitations of cross-sectional perspective

The strategy chosen for this analysis (see Graph 4.7), attempts to circumvent some of these limitations of cross-sectional data by examining a very selective subpopulation: parents with only one child in the household which was born during the last year. This approach is very similar to that employed in previous studies by Konietzka and Kreyenfeld (2005) or Lappegård, Klüsener and Vignoli (2014). By limiting the analysis to parents with a single child less than 1 year of age and mothers up to age 40 the likelihood of missing previously born children is greatly reduced. By limiting the age of children to one year I hope to capture the family situation at birth as precisely as possible.

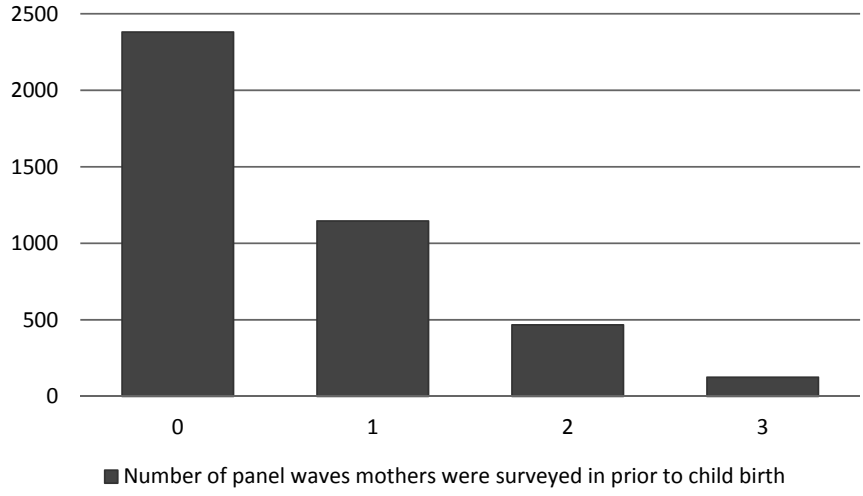


Graph 4.7 Simulating first births with cross-sectional data

Alternative Data Sources

For the analysis at hand I chose to employ the cross-sectional component of the EU-SILC. However, I also considered a number of alternative data sources. As I had a strong preference towards analyzing comparative and up to date data, national data collection efforts or more dated surveys such as the European Community Household Panel (ECHP), the Integrated European Census Microdata (IECM) and the Family and Fertility Survey (FFS) were not considered. As the official statistics microdata provided by Eurostat offer comprehensive coverage of the countries of the European Economic Area, and tend to feature very large samples, they also offer a few alternatives to the cross-sectional EU-SILC data. The most obvious alternative is the longitudinal EU-SILC, which offers all the advantages of the EU-SILC discussed above, but also includes additional retrospective information on marriage and employment history. Hence, in theory the longitudinal EU-SILC is very appealing, yet in practice there are a number of issues which need to be considered.

Due to the rotational panel design employed in the EU-SILC, there is a tradeoff between additional retrospective information and the size of the sample. As the longitudinal EU-SILC is designed as a 4 year rotating panel, in theory, for each additional year of retrospective information considered, 25% of observations are lost. However, one must also to consider that the process of family formation often leads one partner to move in with the other, or the couple to move into a new shared household. However, for individuals which have moved into a surveyed household in later panel waves no retrospective information is available. Graph 4.8 shows the number of women for whom a first birth was observed in the 2011 EU-SILC panel, i.e. between 2008 and 2011. Of the 2380 women who had a first birth during the four panel waves only roughly 5 percent (125) can be observed for all four years.



Graph 4.8 Women with a first birth in 2011 longitudinal EU-SILC

While this loss in observations would greatly inhibit the potential for analysis, selection issues also need to be considered. As no retrospective information is available for individu-

als who have moved into a surveyed household as part of family formation, such cases would have to be dropped from an analysis. This would lead to a sample that is biased towards parents who have lived in the same household for multiple years. This problem is further amplified by the fact that the percentage of individuals followed after leaving their family home in the EU-SILC is very low in a number of countries (Iacovou, Kaminska and Levy 2012, p.11). Thus, studying transitions into marriage or motherhood with the longitudinal EU-SILC is difficult at best. These issues quickly led me to realize that there is less to gain than to lose by employing the longitudinal component of the EU-SILC for this analysis.

Among the data disseminated by Eurostat the EU-LFS provides another interesting alternative. The EU-LFS has a few very obvious advantages over the EU-SILC. The first and most obvious is the longer timeframe of this survey which spans back to 1983. Another big advantage of the LFS is that the sample sizes are far larger than those for the SILC (or any other household survey in Europe for that matter). As the primary objective of the LFS is to collect information on the labor force in Europe, it includes extensive information on labor force participation including a number of retrospective items. However, in the case of the EU-LFS the anonymization criteria are the major deal breaker. In the EU-LFS age is reported in five year age bands, which makes identifying newborns, i.e. children under one year of age impossible.

The most obvious alternative data source for the question at hand is the Generations and Gender Survey (GGS) (Vikat et al. 2007). GGS data, or harmonized histories data (Perelli-Harris, Kreyenfeld and Kubisch 2010) which rely primarily on the GGS, have been employed in a number of recent studies on the topic of non-marital fertility (Perelli-Harris et al. 2010; Lappegård, Klüsener and Vignoli 2014; Hiekel and Castro-Martin 2014). The GGS is a panel survey of individuals which includes information on the economic situation, sociodemographics, attitudes (particularly in relation to gender), the division of labor within the household, and household composition. The survey also includes extensive sociodemographic information on the current partner. As the focus of the survey is on partnership and fertility, it also includes retrospectively collected information on partnership, cohabitation and marriage, as well as information on children of respondents (including non-resident children). These fertility and marriage histories make the GGS so popular for studying non-marital fertility. They allow for a clear ordering in the timing of cohabitation, marriage and fertility.

To date, two survey waves have been conducted. The first wave includes 19 countries (15 EEA countries plus Russia, Georgia, Australia and the USA) and was carried out between 2002 and 2011. The second wave to date has only been carried out in 9 countries, 7 of them European: Bulgaria, Czech Republic, France, Germany, Hungary, Lithuania and the Netherlands. While coverage of the GGS is very broad it does not cover all countries of Europe and in particular does not include a number of the extreme cases mentioned above. Most notably the two countries with the lowest levels of non-marital fertility in Europe Greece and Cyprus are not included in either wave of the GGS or the harmonized histories data.

There is one other major issue with the GGS data in its current form: the first wave does not include full retrospective information on economic activity. Without this information the retrospective marriage and fertility data cannot be fully capitalized on within the

proposed theoretical framework. As the only information one has available for parents is their educational attainment, operationalizing parents' labor market orientation becomes very difficult.

In conclusion, even though the EU-SILC might not present an intuitive choice when analyzing population processes, and was not designed with such questions in mind, it is nonetheless capable of answering the research questions at hand. Additionally, all available alternative data sources have major limitations which make them unattractive for answering the proposed research questions. However, once the second wave of the GGS becomes available for a greater number of countries it would be equally, or even better suited, to examining the relative socio-economic position of parents, albeit for less countries than can be analyzed with the EU-SILC.

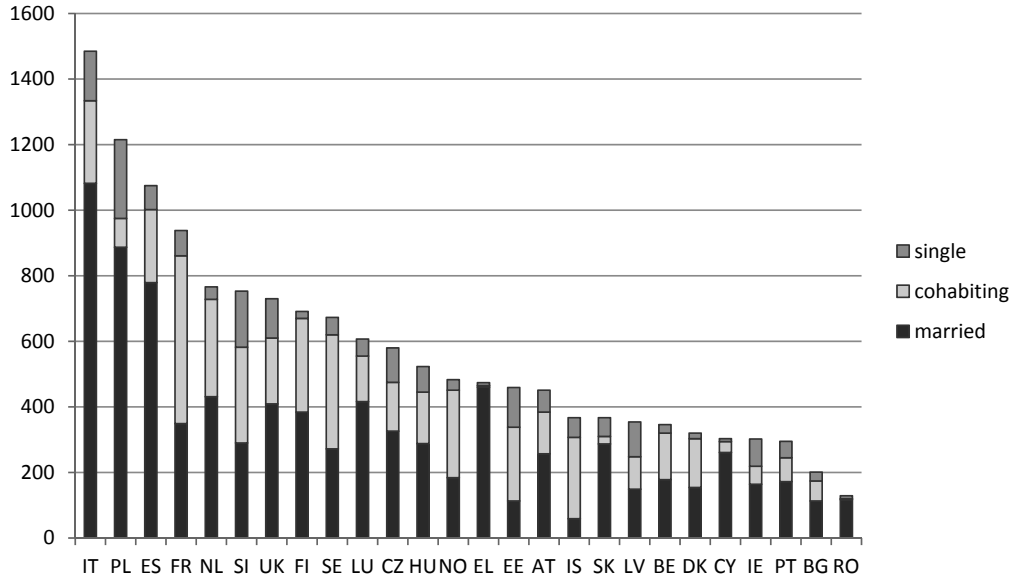
Description of Sample

Graph 4.9 provides an overview of all survey rounds of the EU-SILC included in this analysis. My objective was to include all countries for which microdata was available for 5 or more years. Two countries, for which data was available, had to be excluded: Germany, since the EU-SILC data does not allow me to distinguish between East- and West-Germany, and Lithuania. For Lithuania the coding of marriage status makes it impossible to distinguish between married and cohabiting couples. The omission of Norway 2006 and Belgium 2010-2012 is due to issues with partner identifiers, which prevented me from properly generating households.

As discussed above, the analysis conducted here includes all cases in which a child under 1 year of age, with no siblings, is present in the household and the mother is between 16 and 40 years of age. The intent of this operationalization was to simulate first births. Limiting the age of children to the youngest possible increment was deemed necessary to present the family constellation at the time of birth as precisely as possible (Laplante et al. 2015). The age limit for mothers was set to 40 years in order to ensure that all births recorded are indeed first order births. This step was deemed necessary, since for older women previous children might have already moved out of the household. While limiting the analysis to women 35 or younger would have reduced this risk even further, it would also have biased the sample as it is fairly common for highly educated women to delay childbearing to the latter part of the thirties. Thus, while there is a tradeoff in defining the upper bound in women's age, the arguments for 40 outweigh those for 35.[29] As the EU-SILC only includes very limited information on persons under 16 years of age, all mothers 15 and younger are removed from the analysis.

29 In order to test whether the definition of the upper bound of age affects estimation results, I ran a model which only considers women 35 or younger, and found that estimation results are consistent with those for models which consider only women 40 or younger.

Graph 4.9 EU-SILC rounds included in analysis



Graph 4.10 First births by family status (absolute numbers)

Representativeness of Data

For the selected rounds of EU-SILC a total of 36,403 births are observed, 16,068 to mothers without other children in the household. After removing births to mothers over 40 years of age, 15,181 first births remain. Of these 294 cases cannot be considered due to unit missings for one of the parents. The remaining 14,887 cases form the core of the subsequent analyses. The majority of these births are to married parents (57.6%), roughly a third in cohabiting unions (29.9%), and 12.2% to single mothers. As can be seen in Graph 4.10, there is considerable variation in the sample sizes by country. The sample includes over one thousand observations in Italy, Poland and Spain. On the other end of the continuum, less than 200 observations each are included for Romania and Bulgaria. I also find considerable variation in the prevalence of different family forms throughout Europe. In Greece and Cyprus next to no births outside of marriage can be observed, whereas in France or Iceland marital births are in the minority. Overall, far more births in cohabitation can be observed than to single mothers. However, this pattern is not universal. A higher prevalence of single mothers can be observed mainly in Eastern European countries such as Poland, Latvia, Romania and Slovakia but also in countries such as Ireland and Greece. For the Nordic countries I observe universally low numbers of births to single mothers. While the subsequent analysis will be focusing on the distinction between married and cohabiting couples, single mothers will also be examined in Section 4.2.7.

Table 4.5 Comparing EU-SILC results to official statistics (all parities, weighted data)

	Non-marital fertility ratio		Age At Birth		% Tertiary Educated mothers	
	SILC	Eurostat	SILC	Eurostat	SILC	LFS[1]
Austria	30.1	38.7	29.7	29.5	24.8	18.8
Belgium	36.5	41.8	29.6	29.4	53.1	45.6
Bulgaria	33.0	53.7	26.3	26.8	24.8	14.9
Cyprus	7.2	11.3	29.6	30.2	54.3	50.7
Czech Republic	30.0	37.5	29.5	29.3	25.3	26.5
Denmark	38.3	47.1	30.9	30.4	47.3	28.0
Estonia	54.5	58.7	28.5	28.7	40.8	36.6
Finland	36.0	40.8	30	30.1	48.7	31.3
France	49.6	52.4	29.7	29.8	44.3	38.7
Greece	1.8	6.2	31.3	30.2	39.7	30.8
Hungary	33.8	39.5	28.8	29.0	26.7	22.2
Iceland	64.0	64.8	29.7	29.8	42.3	27.6
Ireland	28.2	33.0	31.2	31.3	46.7	45.9
Italy	16.9	19.7	31.4	31.1	22.1	24.1
Latvia	42.5	44.1	27.9	28.3	35.7	27.7
Luxembourg	24.4	31.0	30.2	30.4	36.5	42.1
Netherlands	33.5	40.5	30.7	30.7	45.1	44.9
Norway	50.6	54.1	30.2	30.0	48.3	34.9
Poland	16.8	19.8	28.1	28.5	35.9	28.8
Portugal	28.9	36.6	30.4	29.6	25.7	22.4
Romania	17.0	28.5	27.7	26.9	18.2	10.6
Slovakia	12.9	30.8	28.3	28.3	30.5	23.5
Slovenia	41.1	52.7	30.2	29.9	39.9	49.8
Spain	17.5	32.2	31.8	31.1	45.5	40.5
Sweden	52.3	54.8	30.1	30.6	50.1	30.2
United Kingdom	39.4	45.6	30.7	29.4	41.7	24.8

(1) Women with children under 2 years of age in household

A further issue which needs to be discussed here is the representativeness of EU-SILC data. Table 4.5 includes information on the percentage of births outside of marriage observed in the EU-SILC, mothers' age at birth, and educational level. As Eurostat does not report parity specific non-marital fertility ratios, and such statistics are not widely available from other sources, this analysis will examine all births observed in the EU-SILC data to women of all ages (36403 cases in total). All statistics reported on the basis of the EU-SILC are calculated on the basis of weighted data and are averaged over the observation period. Data in the columns marked Eurostat, are taken from Eurostat's dissemination database, and correspond to the average of all survey waves for a given country. Data on the percentage

of tertiary educated mothers are calculated on the basis of the EU-LFS, which Eurostat employs as the reference statistic for indicators on educational attainment.

When comparing the percentage of births outside of marriage with those reported by Eurostat it becomes readily apparent that in the EU-SILC data, the percentage of births outside of marriage is considerably underestimated. For all countries under study the values from the EU-SILC are below those reported by Eurostat. While the values tend to differ only by a few percentage points I observe sizeable deviations for a number of countries (most notably for Bulgaria, Romania, Slovakia, Slovenia and Spain). The rank correlation coefficient of .96 indicates that the relative position of countries to each other is fairly well represented by the SILC data. However, based on these numbers the SILC sample might be systematically biased.

One possible explanation, which is easy to verify, is that older mothers, who are more likely to be married, might be overrepresented in the SILC data. Comparing the average age at birth observed in the SILC, with numbers reported by Eurostat I find only fairly small deviations in age at birth. However, for a number of countries they are sizeable: most notably in the Netherlands and Latvia. Based on the data presented here, it does not seem likely that the fairly small deviations in age at birth, can explain the large differences between non-marital fertility ratios in the EU-SILC and official data from birth registers.

A further key sociodemographic that will be examined here is educational attainment, specifically, the percentage of mothers with tertiary education. Following the assumption that higher levels of education increase the likelihood of a marital birth (compare Perelli-Harris et al. 2010), it is feasible to assume that bias in the educational distribution of the sample could also bias the number of births outside of marriage. As Eurostat does not provide education statistics for the subpopulation of mothers with young children, I employed the European Labor Force Survey, which serves as the EU reference statistic for education, in order to generate reference statistics.[30] It becomes readily apparent that the percentage of mothers with tertiary education in the EU-SILC is vastly overestimated in comparison to the LFS.[31] There are only four notable exceptions: the Czech Republic, Italy, Luxembourg and Slovenia. Hence, based on the data presented here, it appears that part of the deviation between the EU-SILC and birth register data can be chalked down to an overrepresentation of mothers with tertiary education. In regards to education, the sizeable bias as observed here is somewhat problematic. However, as mothers' education will be a central explanatory variable in the multivariate analysis, this bias should not affect multivariate estimation results. For the descriptive analysis this is somewhat problematic, however. Thus descriptive statistics should be interpreted with caution. In order to assess the validity of the multivariate analysis, in light of the skewed sample, I specified an alternative model which excludes those countries with most severe deviations in the non-marital fertility ratio (BG, DK, ES, NL and RO). The results for this model can be found in

30 On the basis of the LFS yearly data for 2004 to 2012 the proportion of mother with children under the age of three who hold a tertiary degree is calculated. This deviates from the SILC, where the age of children is limited to 1 year of age. This imprecision is necessary as the LFS does not allow for a more accurate definition of children's age.

31 Compare also Wirth (2014) who examines this issue for Germany.

Appendix D. While some minor differences in the size of coefficients can be observed I find no differences in the significance level of regression coefficients.

4.2.2 Concepts, Measurements and Explanatory Variables

In this section I will briefly reiterate the hypotheses laid out in Chapter 2, discuss the underlying concepts, and how I chose to operationalize them. I will discuss variables employed in the subsequent analysis and variables which were considered, but not utilized in the final analysis. Appendix B includes additional technical notes on all variables, as well as an overview of missing values.

The status attainment hypothesis posits that parents with higher levels of socioeconomic status are more likely to be married. I assume that this effect should be more pronounced in contexts with higher levels of acceptance towards non-marital fertility. In the subsequent analysis three variables will be employed to measure parents' socioeconomic status: equivalized income, measured as the percentile of the respective countries income distribution; home ownership, and the highest level of education attained (for both fathers and mothers).

I also considered including the ESEC (Harrison and Rose 2006) as an indicator of occupational prestige. But since it shows no significant effect, after factoring out education and income, I chose to exclude it for the sake of model parsimony. Furthermore, the high number of missing values in the occupational data, which is employed to construct this indicator, would have been problematic. The inclusion of three different indicators of social status, was deemed necessary, as these different dimensions are discussed in the literature with wealth (Schneider 2012) playing an important role in the U.S. literature, and income is also deemed important (Gibson-Davis 2009). Furthermore, education, particularly mothers' education is of special interest, as it has been discussed extensively in recent European research, and my hypotheses predict that mothers' education entails both a status and an independence effect.

In Chapter 2 I also proposed that status attainment effects should be more pronounced in contexts with higher levels of social acceptance of non-marital family forms. I will test this assumption by employing a macro-level variable which assesses the percentage of population agreeing with the statement "It is okay to live together without being married." As discussed under 3.2, this variable is used, due to unavailability of indicators which directly assess the social approval of childbearing outside marriage. This variable was deemed a good alternative, since at the country level the social approval of cohabitation and the approval of childbearing in cohabitation are highly correlated.

The independence hypothesis argues that mothers with more labor market specific resources are more likely to live in a cohabiting union when a child is born. Specifically, I assume that such an effect is more likely observed where mothers can utilize these resources, due to better compatibility of work and family life. Labor market specific resources are measured via mothers' highest level of education, work intensity in the year prior to the survey, and mothers' earnings, as percentage of a couples shared earnings. The compatibility of work and family life shall be approximated via the child care enrolment of children under 3 years of age.

A further option for measuring mothers' labor market relevant resources is work experience. The concept can be approximated in the EU-SILC via a number of variables. One option is to use a variable which provides the year in which a person began its first regular job. A second variable provides information on the number of years spent in paid work. However, both variables contain a high number of missing values and are not collected in the Nordic countries. Another possibility for approximating work experience is to measure the years since attaining the current highest level of education. This approach is only a very indirect measure of work experience, and the necessary variables contain a considerable number of missing values in some countries. Had I included this measure I would have lost roughly 20% of my sample in Norway for example. This is a tradeoff I was not willing to make. As both mothers' education and work intensity are intended to test the independence hypothesis at the micro-level, the inclusion of the female labor force participation rate, which was employed to test this hypothesis in Chapter 4.1, did not seem necessary or even desirable.

The uncertainty hypothesis assumes that, parents who are confronted with an insecure labor market should be less likely to be married when they have a child. I assume that uncertainty functions both directly, via the labor market situation of parents, and indirectly via the perceived threat of job loss. This uncertainty should be higher when rates of unemployment are higher. At the country level, the unemployment rate will be employed as an indicator of uncertainty. The mean value of the unemployment rate for the previous four years was calculated. This operationalization was guided by the assumption that the economic situation observed over the last years will influence parents' decision making. At the micro-level I will be considering fathers' work intensity. While an unemployment indicator would have been my preferred way of testing this hypothesis at the micro-level, there are next to no unemployed men in the sample.

The gender equality hypothesis assumes that in societies with a higher degree of gender equality, parents are more likely to live in a cohabiting union at time of childbirth. I expect to observe an effect of gender role attitudes which is independent of economic factors. Here I will again employ the gender role attitudes index, which I detailed in Section 3.2, and employed in Section 4.1. As the unemployment rate can fluctuate heavily between years, this variable is calculated separately for each year under study. All other country level variables are not allowed to vary over time, and values from the 2008 European Value Study, presented in Section 3.2, are used.

As the results for the normative backing of marriage hypothesis in Section 4.1 are somewhat disheartening, and no effects for the macro-level covariates church attendance or the agreement with the statement "marriage is an outdated institution" could be observed in initial multilevel models, I chose to forego these factors for the sake of model parsimony. Thus, I will not be testing the normative backing of marriage hypothesis as part of this analysis.

In addition to the variables employed to test these four hypotheses, I will also utilize mothers' age and the age difference between partners as control variables. Additionally, all models specified below include year dummies to control for time trends. Another factor which I considered controlling for is parents' migration history. The EU-SILC includes two variables of interest: citizenship and country of birth. However, due to rigid anonymization criteria in the User Database, these variables only distinguish between country

of residence, any other EU country, and non-EU country. While this scheme might not be a problem when studying single countries, in comparative research it leads to non-equivalence when the migrant population (particularly the non-EU migrant population) of two countries is composed of completely different migrant groups. Due to the imprecision and ambiguity of such a measure, I chose not to consider migration history in this analysis.

4.2.3 Descriptive Statistics

In the next step I will examine descriptive statistics for the independent variables of interest. All descriptive results presented here employ the household cross-sectional weight provided by Eurostat. As the sample sizes for single mothers and cohabiters are fairly small in a number of countries, results should be interpreted with caution. In four countries (Cyprus, Denmark, Greece and Romania) the group of single mothers includes less than 20 cases, in three countries the group of cohabiters includes under 20 cases (Cyprus, Greece, Romania).

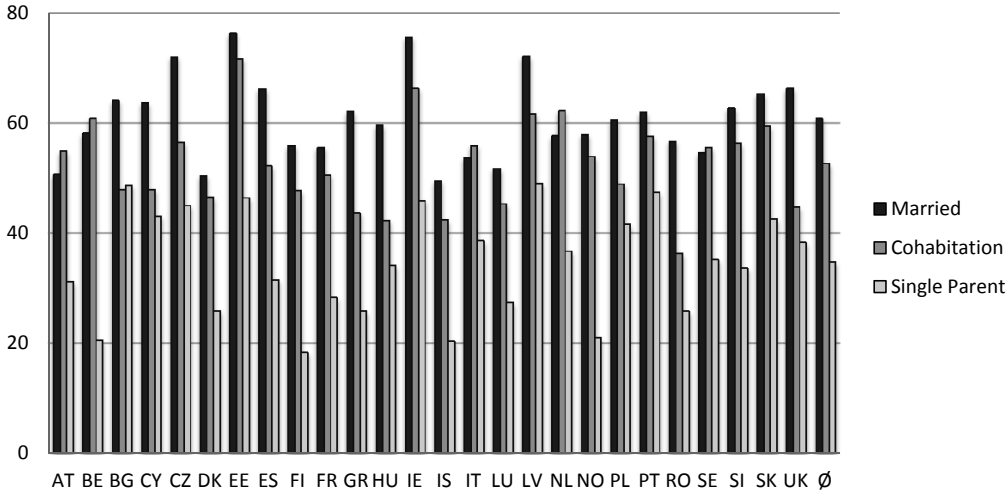
Table 4.6 provides a summary of all variables by country group. Note that father characteristics are only calculated for couple households. The country groups used here are analogous to those employed in Section 3.1.[32] Family arrangements differ considerably between country groups. While cohabitation is the most common family form in the Nordic country group, marriage is by far the most common family type observed at birth of a child for the other three country groups. However the differences between Easter and Southern European groups and Core Europe are quite large. The proportion of single mothers is far higher in Eastern Europe than in any other region, and even slightly higher than the proportion of cohabiters.

Considerable differences between country groups can also be observed in regards to age, home ownership, and educational attainment. Parents in Eastern Europe are considerably younger than parents in other parts of Europe, while parents in Southern Europe are by far the oldest. The average ages in the Core Europe and Nordic group are very similar. Overall these two country groups are very similar in regards to most individual level variables. Educational levels in the Core and Nordic country group are on average considerably higher than in Southern and Eastern Europe. Furthermore, the educational attainment of mothers is far higher in these regions than that of fathers. While there is very little variation between regions in regards to fathers' labor force involvement, considerable differences can be observed for mothers. Levels in the Core and Nordic regions are much higher than in Eastern and Southern Europe. There is also considerable variation between country groups in regards to the macro-level variables. The most extreme differences can be observed for rates of child care enrolment, which are very low in Eastern European countries. Furthermore, considerable differences in attitudinal variables can be observed with attitudes in the Eastern European countries generally being more conservative than in other parts of Europe. In regards to unemployment, considerable differences can be observed between the Core Europe and Nordic countries and Southern and Eastern European countries.

32 Nordic: DK/FI/IS/ NO/SE; Core: AT/BE/FR/IE/LU/NL/UK; South: CY/GR/ES/IT/PT; East: BG/CZ/EE/HU/LV/PO/RO/SK/SI

Table 4.6 Summary of variables by country groups

	Nordic	Core	South	East	Overall
Married (%)	42.4	48.8	76.2	68.2	59.9
Cohabiting (%)	49.2	40.2	16.6	15.4	29.3
Single (%)	8.4	11.1	7.2	16.4	10.7
Home owners (%)	68.7	53.6	65.8	45.1	56.5
Mean eq. income percentile	51.1	53.5	57.7	57.3	55.3
Mean age (mother)	28.1	28.1	29.9	26.3	28.3
Mothers w. low education (%)	9.6	10.4	27.2	10.9	15.5
Mothers w. medium education (%)	40.0	41.5	35.9	53.7	41.9
Mothers w. high education (%)	50.4	48.2	36.9	35.3	42.6
Work intensity (mother)	0.60	0.64	0.61	0.60	0.61
Mean age (father)	30.9	31.2	33.0	29.4	31.4
Fathers w. low education (%)	10.7	13.7	36.7	8.9	19.9
Fathers w. medium education (%)	49.9	46.6	35.4	63.1	46.1
Fathers w. high education (%)	39.4	39.7	27.9	28.0	34.0
Work intensity (father)	0.88	0.89	0.90	0.89	0.89
Child care enrolment	46.5	41.8	33.0	8.9	34.4
Acceptance	90.7	88.5	69.8	60.9	77.7
Unemployment rate	6.2	7.2	10.0	10.2	8.4
Gender role attitudes index	75.4	68.5	63.6	60.7	65.8



Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution (N<20)

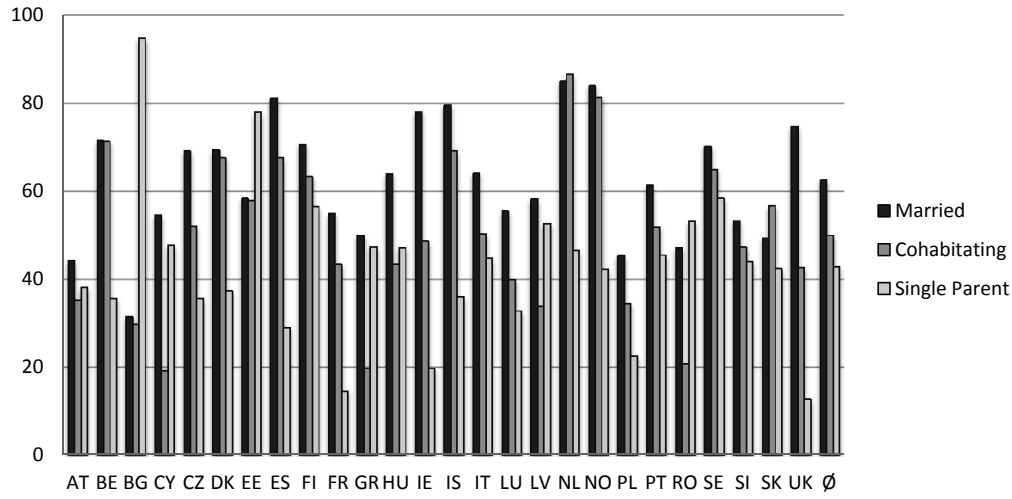
Graph 4.11 Equivalized disposable income percentile by family form

The multivariate analysis will be considering two household-level variables: equivalized disposable household income[33] and home ownership. The equivalized disposable household-income is measured as the income percentile in the respective country, and should be interpreted as households' relative position within a countries income distribution. Graph 4.11 shows the average income percentile for different family forms by country. The mean value on the right hand side (the mean over country averages), indicates that married couples are best off economically followed closely by cohabiters. Single parent families appear to be far worse off financially than couple households, and this is true in all countries.[34] This finding is in line with the status attainment hypothesis, which posits that higher levels of socioeconomic status should be associated with a higher likelihood of parents to be married. However, in a number of countries cohabiters actually have a higher equivalized disposable household income than married couples (AT, BE, IT, NL and SE). When considering the relative position of different family forms within their countries income distribution, some sizeable differences can be observed. In countries such as Estonia, Ireland or Latvia households with young children seem to be relatively well off financially, as can be seen in the relatively high average income percentile observed in these states. In countries such as Austria, Denmark or Iceland this does not seem to be the case.

The second household-level indicator employed to test the status attainment hypothesis, is home ownership. This variable is coded 1 if the mother and/or the father own the house or apartment the family lives in. As expected, I find that married couples more often live in their own home than cohabiters, and cohabiters more often own their home than single parents. When examining individual countries, there are a few exceptions to this rule. The high percentage of home ownership among single mothers in Cyprus, Greece and Romania can likely be explained as a statistical anomaly, due to the small number of cases for these countries. For Estonia and Latvia, where home ownership among single mothers is relatively high, the group of single mothers includes more than 100 cases for each country, and thus likely does not represent an anomaly. When comparing married couples and cohabiters, the Netherlands is the only country in which cohabiters more often own their home than married couples, and the difference is very small.

33 While technically this value corresponds to a single weighted individual it takes on the same value for all members of a household.

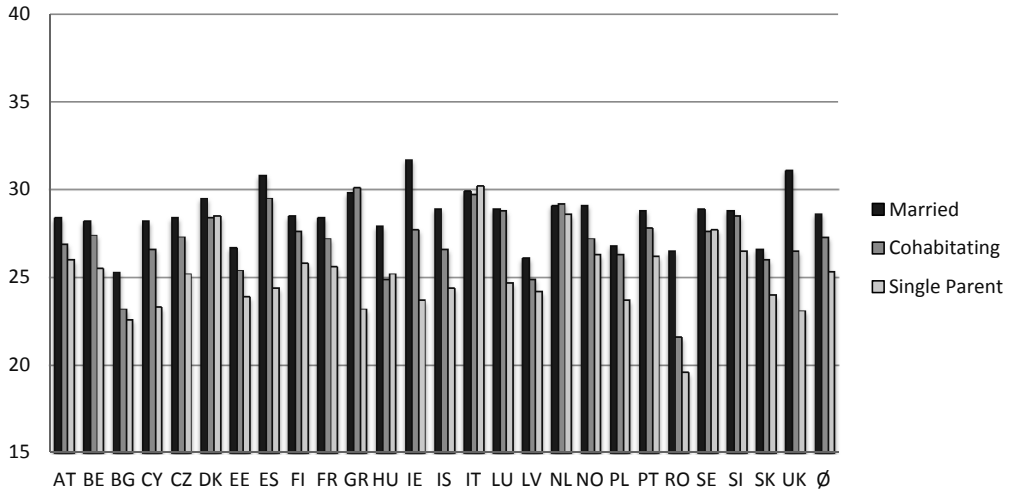
34 Bulgaria is a notable exception here. However, due to the small number of single parent households in the Bulgarian sample these findings should be interpreted with caution.



Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution (N<20)

Graph 4.12 Home ownership by family form (in %)

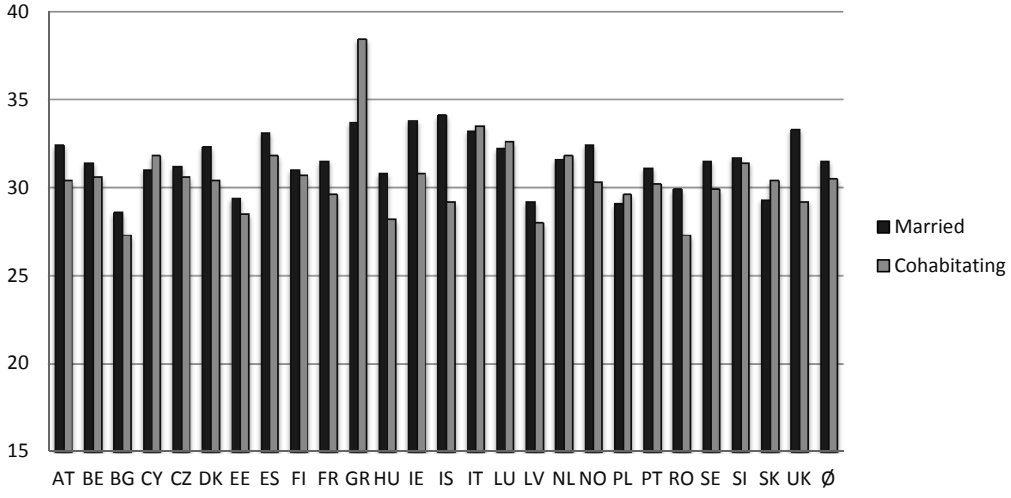
In addition to the household-level variables examined above, the multivariate models will also consider the socioeconomic position of fathers and mothers. Age shall function primarily as a control variable. Nonetheless, it will be interesting to see how family forms differ in regards to age and whether age differences between partners are of relevance. Graph 4.12 shows the average age of mothers at first birth for different family forms. As expected, married mothers are on average older than both cohabiting and single mothers, and cohabiting mothers are older than single mothers. This ordering seems to hold true in almost all countries, and where it is not, only minor differences between groups can be observed. Age differences between family forms are rather large in Ireland or the UK, and very small in other countries such as Denmark. To sum up, married women tend to be oldest and single mothers tend to be youngest but there is some variation between countries in regards to average ages between the different family forms.



Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution (N<20)

Graph 4.13 Mothers' age by family form

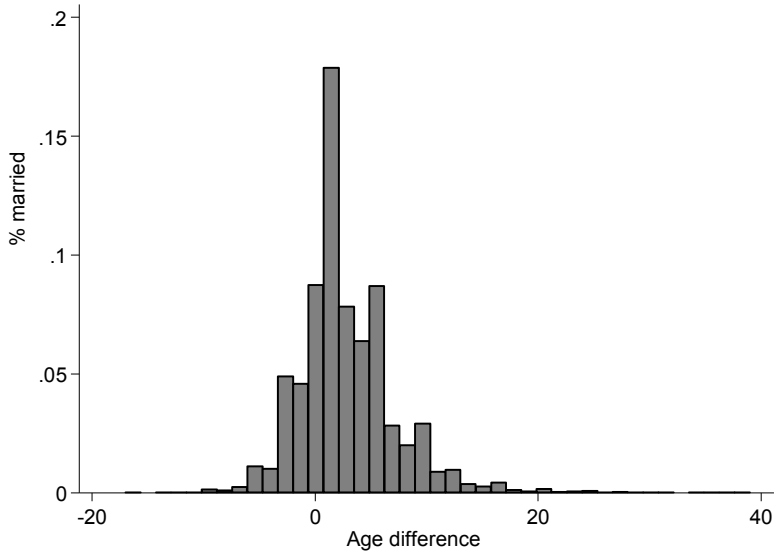
Moving on to fathers' age (Graph 4.14), I find that in most countries married fathers are slightly older than cohabiting fathers. In a number of countries no sizeable difference can be observed, and in some cohabiting fathers are slightly older than married fathers. On average fathers are about 3 years older than mothers, both in cohabiting and marital unions. However, this age difference might be slightly overestimated, as mothers' age was limited to 40, no such restriction regarding the age of fathers.



Results for cohabiters (GR, RO) must be interpreted with caution (N<20)

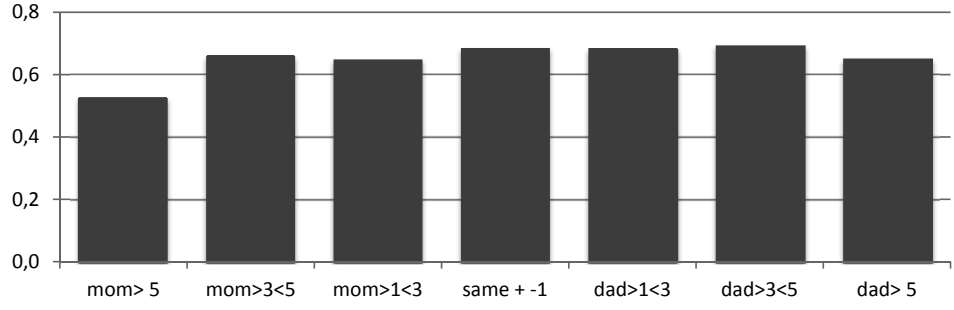
Graph 4.14 Fathers' age by family form

Graph 4.15 is a histogram of age differences between parents. Negative values indicate that mothers are older than fathers. The distribution is slightly right skewed, with the right hand tail extending out up to almost 40 year age differences. For the majority of parents age differences are fairly small. Cases in which fathers are older than mothers are more common than vice versa, and the absolute age differences are also larger for couples in which fathers are older.

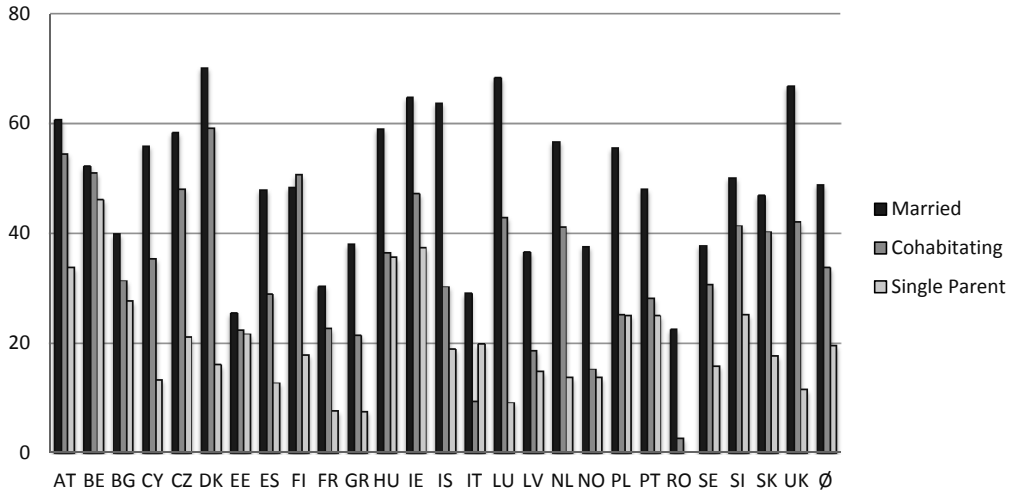


Graph 4.15 Age difference between partners

In order to examine how these age differences are associated with marital status at birth of a child, Graph 4.16 shows the proportion of married couples by age difference categories. It becomes apparent that the effect of age difference is not unidirectional. For all groups in which mothers are older, the percentage married is lower than in the middle category (same age). When fathers are 3 to 5 years older, the proportion married is slightly higher than for the same age group. However these differences are not substantial. When fathers are more than 5 years older than mothers, the propensity to be married declines compared to the reference category.



Graph 4.16 Proportion married by age difference



Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution (N<20)

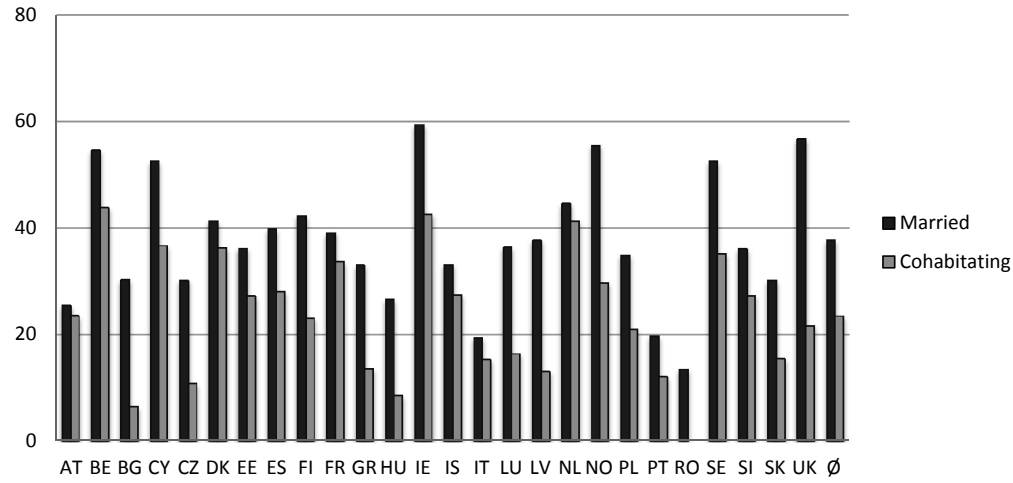
Graph 4.17 Mothers with tertiary education by family form (in %)

Information on the highest level of education attained is reported via the ISCED classification in the EU-SILC, and is grouped into 6 categories. Following the example of the Luxembourg Income Study,[35] these 6 categories are recoded to three categories: 'low' which includes primary, pre-primary and lower secondary education as well as those who never attained any formal education;[36] 'medium' which includes upper secondary and post-secondary non tertiary education; and 'high' which includes tertiary education. Graph 4.17 shows the proportion of mothers with tertiary education by family status and country. As the status attainment hypothesis would predict, married women have most often completed a tertiary degree. This observation holds true for all countries save for the Netherlands. Single mothers have a tertiary degree far less often than women in other family forms.

When examining the educational level of fathers in Graph 4.18, I find that married men tend to have a tertiary degree far more often than men living in cohabiting unions. This observation holds true in all countries. A further interesting observation is that for both married and cohabiting couples a higher proportion of mothers than fathers possess a tertiary degree. In a next step educational combinations of fathers and mothers will be examined.

35 http://www.lisdatacenter.org/wp-content/uploads/standardisation-of-education-levels.pdf

36 These cases are treated as missing in the EU-SILC but are identifiable via a flag variable



Results for cohabiters (GR, RO) must be interpreted with caution (N<20)

Graph 4.18 Fathers with tertiary education by family form (in %)

Table 4.7 shows the distribution of educational combinations for married and cohabiting couples. It becomes readily apparent that there is a strong tendency towards educational homogamy. Over 60% of parents live in partnerships in which both partners have the same level of education. Cases in which one partner is highly educated and the other partner has a low level of education are particularly rare. As a consequence of mothers higher levels of education, I also find far fewer households in which the father has a higher level of education (12.3%) than households in which mothers are better educated (26.7%).

Table 4.7 Distribution of educational combinations (in %)

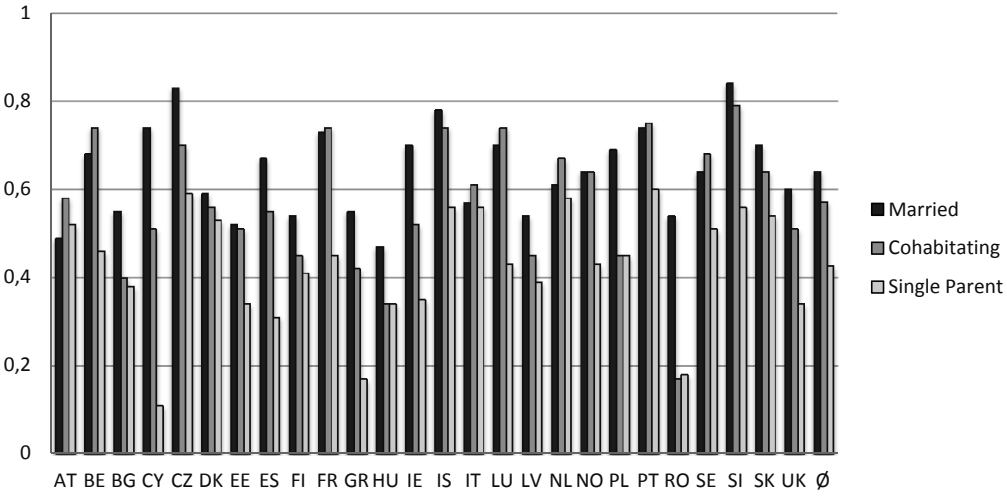
Father/Mother	Low	Medium	High
Low	8.7	7.5	3.8
Medium	4.3	26.5	15.4
High	1.0	7.0	25.8

Table 4.8 provides information on the proportion married for each educational combination. The highest rate of marital unions can be observed for highly educated fathers, who have a partner with low levels of education. This is followed by couples where both partners are highly educated, and the combination mother high/father low. What is interesting is that the percentage married is far lower for the combinations of high and medium than for other combinations that include a partner with high education. In fact, the percentage married for these combinations is similar to the groups without highly educated partners.

Table 4.8 Proportion married by educational combination

Father/Mother	Low	Medium	High
Low	63.0	61.9	73.0
Medium	65.5	63.5	65.5
High	79.2	64.6	74.4

In order to assess parents' involvement in the labor market, I created an index which takes on scores between 0 and 1. This indicator was constructed on the basis of items which assess an individuals' labor market activity for each month of the previous year. For each month in which a person was not working a score of 0 was assigned. If a person was working part-time a value of .5 was assigned. If a person works full-time a score of 1 was assigned. The sum for all months was divided by 12. A score of 0 indicates that a person was economically inactive for the entire year, while a score of 1 indicates that a person was employed full-time year round. The independence hypothesis proposes that higher levels of mothers' employment should lead them to forego marriage, due to increased financial independence. However, when examining Graph 4.19, I find that the contrary is actually the case, and that married mothers tend to be better integrated into the labor market than cohabiting or single mothers. This could be due to the fact that married mothers have higher levels of education. This association will have to be further examined in the multivariate analysis.

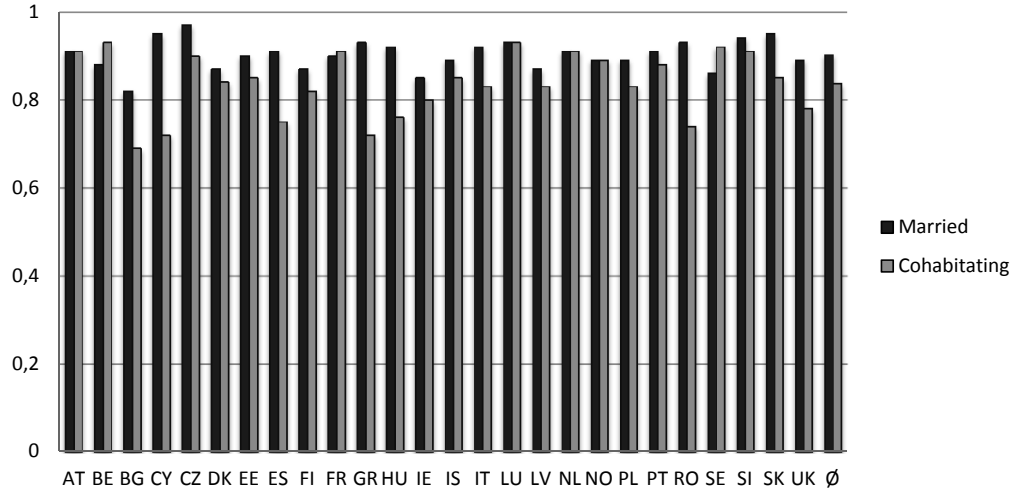


Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution (N<20)

Graph 4.19 Mothers' work intensity by family form

When examining fathers' work intensity, I find that on average married fathers are more involved in the labor market than cohabiters. These differences are not overly large, and in some countries cohabiting fathers actually work more than married fathers. On average

fathers' work intensity is much higher than that of mothers. The uncertainty hypothesis assumes that fathers who are better integrated into the labor market should also be more likely to be married. These descriptive findings do not provide strong support for this assumption.



Results for cohabiters (GR, RO) must be interpreted with caution (N<20)

Graph 4.20 Fathers' work intensity by family form

After examining all variables of interest, I will now have a look at correlations among these variables and the dependent variable of the subsequent analysis. Correlations between the cohabitation/marriage dummy and the dependent variables are very low. The strongest correlations can be observed for mothers and fathers age (.177 and .153). However, neither of these correlations can be considered strong by any standard. I also observe correlations over .1 for household income and home ownership. When examining the educational categories, I observe a positive correlation for high education for both father and mother, but a negative correlation for medium education. No correlation can be observed for mothers' work intensity. A positive correlation is observed for fathers' work intensity. When considering correlations between covariates I find a strong correlation (.659) between fathers' and mothers' age, this comes as no surprise, and in the multivariate models will be accounted for by including mothers' age, alongside a variable which measures age difference. The age variables are also positively associated with income and home ownership. Interestingly, I observe stronger correlations for mothers' age. This could be due to the fact that there is less variation on this variable. As can be seen from Table 4.7 fathers' and mothers' education are strongly correlated. This correlation is especially strong for highly educated parents (.450), indicating a stronger preference for monogamy by those with tertiary education. High levels of education for mothers and fathers are also strongly associated with higher income (.382 and .347 respectively). Another high correlation, which is not overly surprising, is that between work intensity and income. The correlation between mothers' work intensity and the equivalized income (.493) is considerably higher than for fathers

(.364). This comes as no surprise, as work intensity of fathers tends to be universally high. Hence, there is far less variation within this variable and thus the level of household income is more strongly determined by mothers' employment. Mothers' work intensity also shows a higher correlation with age (.237) than fathers' (.119). The same is true for tertiary education (.256 versus .103). Furthermore, I observe a positive correlation between fathers' and mothers' work intensity.

Table 4.9 Correlations between micro-level variables

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Married	(1)	1.000									
Eqiv. Income	(2)	.149	1.000								
Home ownership	(3)	.130	.323	1.000							
Age (m)	(4)	.177	.388	.313	1.000						
Age (f)	(5)	.153	.255	.236	.659	1.000					
Educ. (m med)	(6)	-.067	-.181	-.102	-.188	-.126	1.000				
Educ. (m hi)	(7)	.079	.382	.192	.300	.171	-	1.000			
Educ. (f med)	(8)	-.056	-.110	-.066	-.131	-.085	.309	-.219	1.000		
Educ. (f hi)	(9)	.081	.347	.153	.239	.133	-.295	.450	-	1.000	
Work intens. (m)	(10)	.002	.493	.202	.237	.100	-.077	.256	-.034	.180	1.000
Work intens. (f)	(11)	.080	.364	.181	.119	.075	.001	.103	.010	.107	.196

In conclusion, correlations between the micro-level independent variables and marital status are rather low. While this does not bode well for the postulated hypotheses, associations might become more apparent after factoring out age, which is strongly correlated with a number of predictors.

Table 4.10 includes correlations for the dependent variable and the country level predictors. Examining the correlations between the cohabiting/married dummy variable and the country level covariates, I observe moderately high negative correlations between the dependent variable and child care enrolment, acceptance and gender roles. These associations conform to theoretical expectations. The strongest correlation can be observed for the gender role attitudes indicator. For the unemployment rate, a positive correlation with the dependent variable can be observed. This finding is contrary to the assumption of the uncertainty hypothesis. However, in Section 4.1, the bivariate association between unemployment and non-marital fertility ratios was also negative. Furthermore, I observe a moderate negative association between unemployment and child care enrolment. The high levels of correlation (all over .7) between acceptance, gender roles and child care enrolment reveal the tight association of these factors. While this isn't overly surprising, it provides further proof to the assumptions of modernization theory that values and institutions are tightly interrelated. Furthermore, it will be interesting to observe whether clear effects can be observed when all variables are introduced into the model simultaneously.

Table 4.10 Correlations between macro-level variables

	Married	Child care enrolment	Acceptance	Unemployment rate	Gender role attitudes
Married	1.000				
Child care enrolment	-.216	1.000			
Acceptance	-.269	.708	1.000		
Unemployment rate	.154	-.447	-.304	1.000	
Gender role attitudes	-.302	.705	.769	-.295	1.000

4.2.4 Random Intercept Models

This first step of the multivariate analysis presented here will limit itself to examining the effect of individual level predictors (also referred to here as level one). Multilevel models with random intercepts will be used (Hox 2010, Snijders and Bosker 2011). Due to the binary nature of the dependent variable logistic multilevel models are specified. As is common practice in multilevel analysis, I will build my models stepwise (Langer 2010; Braun et al. 2010). In a first step, random intercept only and random intercept models, which introduced the micro-level variables, are run. Additionally, this section attempts to study differences between regions by specifying separate models for each country group.

Table 4.11 reports logit coefficients and standard errors for these models. The marital status of parents with children serves as the dependent variable in the analysis. Values of 0 indicate that parents live in a cohabiting union, and the value 1 is assigned to married couples. Coefficients should be interpreted as changes in the logarithmized odds of living in a marital versus a cohabiting union with a child under one year of age.[37] The models include 12748 cases from 26 countries. Mothers' age was logarithmized as descriptive analysis revealed that the relationship between age and marital status is not linear. Additionally, all continuous variables are centered on the grand mean. Technical notes on the operationalization of variables can be found in Appendix B.

The deviance is calculated as -2*the log likelihood and serves as an indicator of model fit. Lower values indicate a better fit of the model. As can be seen by comparing deviance statistics between models, the introduction of additional variables into the model leads to a decrease in the deviance statistic with each step. These changes are of varying magnitude and especially small in model 3, which introduces the income variable.[38] The intraclass correlation coefficient (ICC) is reported as a measure of variation at the country level. A look at the ICC values reveals that the addition of individual level predictors actually does little to explain the variation at the country level, but instead leads to a slight increase in the ICC. This indicates that after controlling for the individual characteristics of respondents, the variation between countries actually increases. Thus, composition effects cannot explain variance between countries. Instead, after considering the composition of

37 Appendix D also includes regression tables with average marginal effects.

38 Likelihood Ratio Tets indicate a significant (.05) improvement in model fit for all steps of the sequential modeling.

populations in all countries under study, the differences between countries actually appear more pronounced.

Table 4.11 Random intercept models with level 1 predictors

	m 1	m 2	m 3	m 4	m 5	m 6	m 7
Age (mother)		2.450** (0.131)	2.250** (0.146)	2.092** (0.149)	1.777** (0.153)	1.693** (0.153)	1.720** (0.154)
Father younger (>5)		-1.435** (0.171)	-1.379** (0.172)	-1.344** (0.172)	-1.270** (0.172)	-1.199** (0.173)	-1.178** (0.173)
Father younger (4-5)		-0.637** (0.135)	-0.601** (0.136)	-0.577** (0.136)	-0.551** (0.137)	-0.526** (0.137)	-0.521** (0.138)
Father younger (2-3)		-0.485** (0.088)	-0.467** (0.088)	-0.450** (0.088)	-0.419** (0.088)	-0.411** (0.088)	-0.407** (0.089)
Same age +/-1		Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Father older (2-3)		0.027 (0.058)	0.023 (0.058)	0.019 (0.058)	0.030 (0.059)	0.038 (0.059)	0.030 (0.059)
Father older (4-5)		0.108 (0.067)	0.105 (0.067)	0.100 (0.067)	0.128 (0.067)	0.134* (0.067)	0.127 (0.067)
Father older (>5)		-0.147* (0.060)	-0.143* (0.060)	-0.157** (0.060)	-0.129* (0.060)	-0.119* (0.061)	-0.130* (0.061)
Equivalized income			0.003** (0.001)	0.002* (0.001)	-0.000 (0.001)	-0.002 (0.001)	-0.002 (0.001)
Home ownership				0.255** (0.049)	0.242** (0.049)	0.242** (0.049)	0.237** (0.050)
Education (mother) Low					Ref.	Ref.	Ref.
Medium					0.114 (0.068)	0.049 (0.071)	0.056 (0.072)
High					0.527** (0.077)	0.359** (0.081)	0.378** (0.082)
Education (father) Low						Ref.	Ref.
Medium						0.170** (0.064)	0.165* (0.065)
High						0.498** (0.076)	0.491** (0.076)
Work intensity (mother)							-0.157* (0.064)
Work intensity (father)							0.287** (0.085)
Constant	1.102** (0.242)	1.258** (0.252)	1.248** (0.252)	1.021** (0.259)	0.776** (0.269)	0.644* (0.273)	0.647* (0.273)
Variance (Country)	1.361** (0.396)	1.449** (0.420)	1.442** (0.418)	1.487** (0.431)	1.549** (0.448)	1.586** (0.458)	1.570** (0.454)
Deviance (-2 ll)	14243	13815	13806	13779	13700	13648	13630
ICC	0.293	0.306	0.305	0.311	0.320	0.325	0.323

Logit coeff. s.e. in parentheses; N=12748; * p < .05, ** p < .01; year fixed effects not shown

Model 1 contains only the year fixed effects (which are not shown in the table), but is interesting nonetheless, for the deviance and in particular the intraclass correlation coefficient. The ICC of the null model is often employed to evaluate whether specification of a multilevel model is mandated. The ICC value of .293 indicates that roughly 30% of variance in the dependent variable can be attributed to country differences.[39] This is a fairly large value which indicates that the specification of multilevel models is a sound decision.

Model 2 includes the control variables age of mother and age difference. Age was logarithmized as the descriptive analysis revealed that the association between age and marital status is curvilinear. I observe the expected significant positive effect for the logarithmized age variable.[40] As the descriptive analysis shows, the association between age difference and marital status of parents is not linear and also differs for fathers and mothers. Thus, it was modeled as a categorical variable with 7 values. The reference category includes partners of the same age (+-1 year). Additionally, three categories each are included for cases in which fathers are older than mothers and vice versa. The first category includes age differences of 2 to 3 years; the second 4 to 5 years and the last more than 5 years age difference. Examining the effect of age differences, I find that when mothers are older than fathers this seems to be universally associated with higher odds of not being married. When fathers are older than mothers, I observe no significant differences between the reference category and cases in which fathers are 2 to 3 or 4 to 5 years older. However, I do observe a negative effect on the likelihood of being married for couples in which the father is more than 5 years older than the mother. This effect is less pronounced than when mothers are older than fathers, but is significant.

Model 3 includes the equivalized disposable income, which is expressed as percentile of a countries income distribution. The status attainment hypothesis predicts that higher income levels are associated with a higher likelihood of living in a marital union. Indeed a significant and positive effect for the income variable can be observed. The magnitude of this effect is rather small, however. A change in one percentile point within a countries income distribution is associated with a .3% increase in the log-odds of being married versus living in a cohabiting union. For home ownership, a significant positive effect on the likelihood of being married can be observed in model 4. This finding is in line with the status attainment hypothesis.

Model 5 introduces mothers' education to the model. As descriptive results indicate, a strong positive effect on the likelihood of being married for high levels of education can be observed. While I also find that mothers with medium levels of education are more likely to be married, this effect is much smaller in magnitude and not statistically significant at the .05 level. This finding confirms the descriptive results above, and is also in line with recent research (Perelli-Harris et al. 2010) which argues that the association between women's education and childbearing in cohabitation is negative. The observed effect is also in line with the status attainment hypothesis. In model 6 I compare the effect of mothers' education with fathers' education. Here I find that after the inclusion of fathers' education the

39 For the empty model without the year dummies the ICC takes on a value of .289

40 The coefficient of logged age is hard to interpret as it covers more than the entire span of the age variable (log(16) =2.77 log(40)=3.68). Thus the difference between likelihood of being married at childbirth for mothers aged 16 and mothers aged 40 corresponds to 91% of the log coefficient.

effect of both medium and high education of mothers decreases considerably. Considering the high level of correlation between mothers' and fathers' education this finding isn't overly surprising. It does, however, indicate that the higher likelihood of highly educated women to be married can be partially attributed to more favorable partnering. When comparing the effect of mothers' and fathers' education, I find that the effect of fathers' education on the likelihood of marriage is considerably higher for the high education category, and more than three times larger, and significant, for the medium education category. As to why effects for mothers' education are considerably lower than for fathers, the independence hypothesis provides a plausible explanation. Fathers' education entails only a status attainment effect, while mothers' education entails both a positive status attainment effect and a negative independence effect.

Model 7 additionally considers the work intensity indicator for both parents. A sizeable positive effect for fathers' work intensity on the odds of being married can be observed. This finding is in line with the predictions of the uncertainty hypothesis. The effect for mothers' work intensity is negative, a finding contrary to the results of the bivariate correlation, but in line with assumptions of the independence hypothesis. This is an interesting result, which is consistent with other recent research which finds that the effect of employment on marriage tends to be gendered (Vergauwen and Neels 2014).

Before moving on I will also examine how the effects of my covariates change between models. The effect for mothers' age remains significant in all model specifications, but the inclusion of additional covariates does reduce the effect of age considerably. In particular, the inclusion of the income variable in model 3, and mothers' education in model 5 lead to sizeable reductions in the effect of mothers' age. Hence, part of the age effect can be attributed to higher levels of educational attainment, and higher incomes of older mothers. However, even after factoring out these socioeconomic characteristics a sizeable age effect remains. The age effect could be attributed to two factors, not accounted for in this model, which naturally increase with age and should be positively associated with likelihood of being married when having a child: relationship duration and work experience. Contrary to the other predictors, the inclusion of mothers' work intensity actually leads to a slight increase of the effect of mothers' age. When examining the effects of age differences, I find that these are fairly stable over all models. Controlling for additional socioeconomic characteristics seems to reduce the magnitude of age differences slightly.

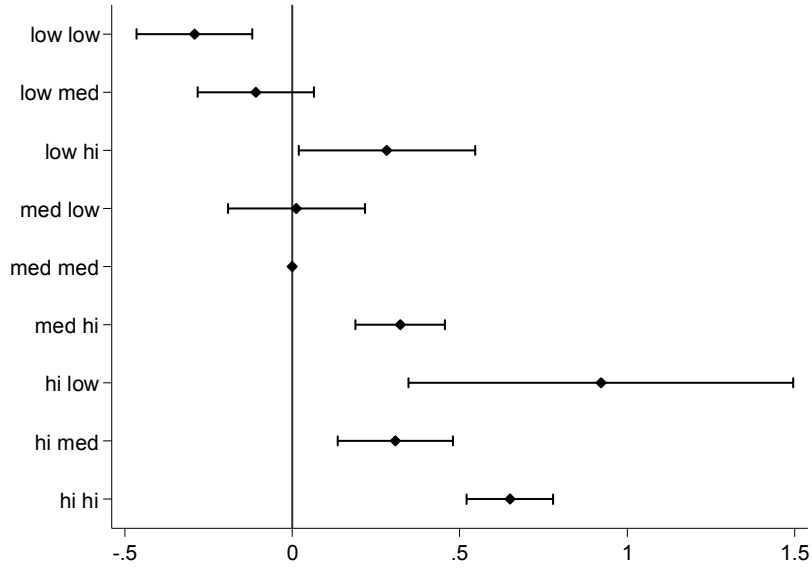
When examining the income variable I observe that with the inclusion of the socioeconomic characteristics of parents, the coefficient for income is no longer significant. Furthermore, the effect turns negative. Apparently, the combination of parents' work intensity and level of education is a strong predictor of a households' income. However, one could also argue that the decision to marry is not so much dictated by one's earnings but by social class which is far better described by education. This interpretation actually supports the sociological position that status attainment is more about the symbolic nature of marriage, and not so much about insuring one's economic position.

Contrary to income, the effect of home ownership seems to be very stable in magnitude and decreases only slightly with the introduction of other level 1 predictors. This is very much in line with the arguments proposed by Cherlin (2004), who sees the purchase of a home as a key milestone in achieving a middle class lifestyle. However, when consider-

ing parents motivations for choosing marriage over cohabitation, the mechanism at work might also be that of marriage as insurance of a shared investment.

Parents' Relative Socioeconomic Resources

As the independence hypothesis is based on Becker's specialization assumption, I attempted to further explore how the relative socioeconomic characteristics of partners affect marital status at time of the birth of their first child. I specified a model which includes a variable with 9 educational combinations instead of the individual education dummies for mothers and fathers. This model is otherwise identical to model 7. The effects for the different educational combinations are plotted in Graph 4.21, alongside 5% confidence intervals. The combination medium – medium serves as the reference category. The left hand label corresponds to fathers' education and the right hand label to mothers' education, i.e. low-medium indicates a couple in which the father has a low level of education and the mother has medium education.



Graph 4.21 Educational combinations (logits)

Examination of the individual coefficients reveals that the combination of highly educated fathers and mothers with low education has the highest likelihood of being married at the time of childbirth. This finding is in line with descriptive results, and supports the independence hypothesis. The confidence interval for this group is extremely large, however. Further examination[41] revealed that the hi-hi and hi-low combination are not significantly different from each other. However, the likelihood of being married for these two groups

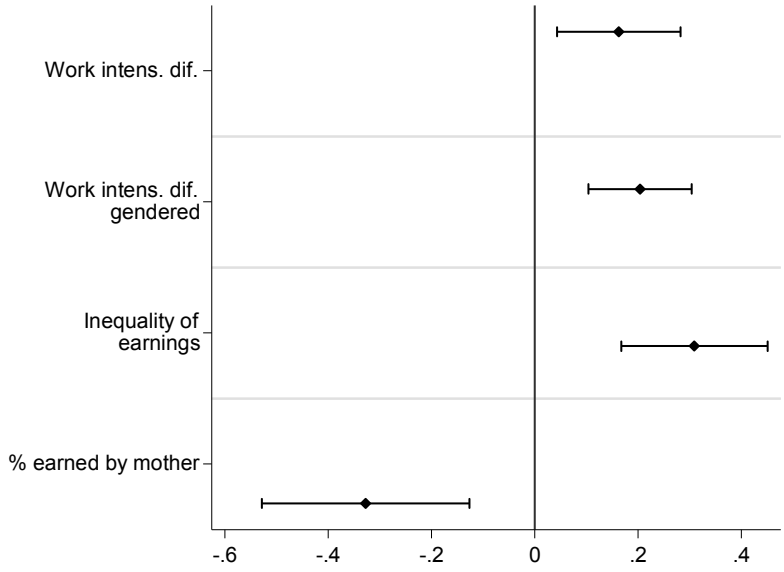
41 The confidence intervals in this plot indicate whether an effect is significantly different from the reference category. I ran additional models with varying reference categories to verify whether differences observed here are significant.

is significantly higher than for all other educational combinations. Furthermore, I find no significant differences in likelihood of marriage between the other combinations which include one partner with high education. For all but one exception, low – hi compared to medium-low, the likelihood of combinations with at least one highly educated partner to be married is significantly higher than for all combinations without. It appears that it is particularly couples with at least one highly educated partner which are more likely to be married. At the other end of the continuum the low-low category has the lowest likelihood of marriage, and these differences are significant in comparison to all other educational combinations. No significant differences can be observed for the other combinations of low and medium education.

The specialization assumption (Becker 1991), which serves as the baseline of the economic independence hypothesis, would have predicted that couples which are not matched in regards to educational attainment should benefit more from a specialized division of labor. To ensure this specialized division of labor they should be more likely to marry. However, the examination of educational combinations finds that it is far more important whether at least one partner is highly educated. In order to further test whether differences in parents education play a role, I specified a model which includes a dummy specifying whether parents have the same level of education, while excluding information on individual educational attainment. However, no significant effect can be observed for this dummy. Thus, it appears that differences in education between parents cannot explain their marital status. Instead I observe a strong bias for couples with at least one highly educated parent to be married. These findings are very much in line with other recent research (Trimarchi and Van Bavel 2015) which examines the relative educational attainment of partners and childbearing outside marriage.

Another possibility for exploring relative characteristics of parents is to examine differences in labor force involvement and earnings between couples. Graph 4.22 includes coefficients from different models which consider these variables. These coefficients are estimated on the basis of separate models, all of which are specified analogous to model 7, but replace mothers' and fathers' work intensity with the reported variables. The first variable considered is the absolute difference between partners work intensity. The variable takes on values from 0 (equal labor force involvement of both partners) to 1 (one partner not working, other partner working full-time year round). The observed positive coefficient is conform with the assumption that parents with more specialized labor force arrangements tend to be married more often. This finding supports the independence hypothesis.

The next coefficient shown, considers not only differences in work intensity between partners, but also whether mothers or fathers are more involved in the labor market. A value of -1 is assigned when mothers are active full-time year round and fathers do not work, a value of zero corresponds to equal labor force involvement, and a value of one is assigned to couples in which the father is working full-time and the mother is inactive. Again I observe a positive effect, as was to be expected due to the reverse sign of the individual coefficients in model 7. The effect is slightly more pronounced than that for the non-gendered variable. This indicates that the effect of specialization is not the same for fathers and mothers.



Graph 4.22 Work intensity and earnings differences (logits)

Additionally, I examined the effect of parents' relative earnings.[42] The inequality of earnings indicator does not consider gender, and only examines inequality in earnings between partners. Values of 0 indicate equal earnings, and values of 1 indicate that one partner is exclusively responsible for the household income while the other earns nothing (or a negative amount which I recoded to 0). As above, I find that specialization leads to increased likelihood of being married at the time of birth of a first child. The final variable in the graph considers mothers' contribution to the earnings of both partners. It takes on a value of 0 if mothers earn nothing, .5 if they earn the same amount as their partner and 1 if they are the household's sole earner. I observe a strong negative effect of mothers' earnings on the likelihood of being married, a finding which again underlines the independence assumption. In summary, I find that while the results for relative education of partners are more in support of the status attainment hypothesis, the effects observed for relative work intensity and earnings are very much in support of the economic independence assumption. It becomes apparent from this analysis is that the effects of father and mother characteristics behave very differently.

Analysis by Country Groups

In order to better understand how the effect of parents' individual socioeconomic resources varies between contexts, I reran model 7 for the four country groups: Nordic, Core, South-

42 The individual income of both parents is calculated on the basis of the various income components provided in the EU-SILC. In countries for which gross earnings are available they are used for both partners. Otherwise net earnings are used. As income can take on negative values, negative incomes are recoded to zero to allow for proper estimation of relative earnings.

ern and Eastern Europe.[43] The results can be found in Table 4.12. In order to allow for comparison of estimates from different populations, average marginal effects are shown. Before examining the effects of individual characteristics, a look at the ICC reveals an interesting pattern. Only very little variation between countries can be observed in the Nordic and Core Europe regions (intraclass correlation of .081 and .063 respectively), indicating that countries in these groups appear to be very homogenous. The same cannot be said for the Southern and Eastern European country groups. Here I observe considerable variation between countries (ICC values of .321 and .277 respectively).

The magnitude of the age effect varies considerably between the four regions. The largest age effect can be observed in the Core European countries, followed by the Nordic countries. The age effect in the Southern and Eastern European countries is far less pronounced, indicating that age differences between cohabiters and married parents are far smaller in these regions. Much like in the integrated model, no sizeable effect of income can be observed in any region. I do find a significant effect in the Southern European countries. However, contrary to theoretical predictions, it is actually negative. While in all regions a positive effect of home ownership on the likelihood of being married can be observed, this effect is only significant in the Core and Southern European regions, and is strongest in the Core country group. When it comes to effects of mothers' education, marked differences between the regions become apparent. Both in the Nordic and Core European countries, I observe that mothers with medium levels of education are significantly less likely to live in a marital union compared to mothers with low levels of education. However, no significant differences can be observed between highly educated mothers and those with low levels of education. This pattern differs from that observed in the integrated model, and from the effects observed for the Southern and Eastern European countries. In the Southern European countries, no differences between mothers with low and medium levels of education can be observed, while highly educated mothers are significantly more likely to be married than mothers with little education. In the Eastern European countries, I observe that mothers with medium and high education are significantly more often married compared to mothers with low education. These effects are much more pronounced than in the Southern European countries. These results regarding the effect of mothers' education serve as a first indication that the effect of mothers' education is indeed dependent on context.

Moving on to fathers' education, I find that highly educated fathers are married significantly more often than fathers with little education in all regions save for Southern Europe. This effect is most pronounced in Eastern Europe, much like it was for mothers. This indicates a very strong association of marriage with higher levels of education in Eastern Europe. A further interesting observation is that in the Southern European countries, no effect for fathers' education can be observed.

43 Initially, I had planned to analyze individual regressions for each country in order to better contextualize results. However, such an approach brings with it a number of issues. On the one hand, the large discrepancies in sample sizes between countries and the very small samples in some countries makes it difficult to compare country-level effects, as I only observe very few significant effects. On the other hand, the massive amount of data from 26 countries makes it difficult to display results and draw clear conclusions. The results of individual country regressions are included in Appendix D.

Table 4.12 Random intercept models by country group (AMEs)

	Nordic	Core	South	East
Age (mother)	0.342**	0.467**	0.142*	0.160**
	(0.082)	(0.061)	(0.063)	(0.060)
Father younger (>5)	-0.148	-0.269**	-0.160*	-0.246**
	(0.077)	(0.072)	(0.074)	(0.082)
Father younger (4-5)	-0.047	-0.121*	-0.078	-0.108
	(0.070)	(0.053)	(0.050)	(0.057)
Father younger (2-3)	-0.048	-0.089*	-0.039	-0.101**
	(0.042)	(0.036)	(0.026)	(0.037)
Same age +/-1	Ref.	Ref.	Ref.	Ref.
Father older (2-3)	-0.011	0.020	0.002	-0.000
	(0.028)	(0.022)	(0.013)	(0.020)
Father older (4-5)	0.010	0.039	0.008	0.012
	(0.033)	(0.025)	(0.014)	(0.022)
Father older (>5)	0.017	-0.005	-0.028	-0.064**
	(0.030)	(0.023)	(0.018)	(0.023)
Equivalized income	-0.000	-0.000	-0.001*	-0.000
	(0.001)	(0.000)	(0.000)	(0.000)
Home ownership	0.042	0.078**	0.042*	0.029
	(0.026)	(0.021)	(0.020)	(0.017)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.
Medium	-0.087*	-0.085**	0.039	0.102**
	(0.044)	(0.030)	(0.021)	(0.036)
High	0.011	-0.022	0.061*	0.163**
	(0.047)	(0.032)	(0.029)	(0.044)
Education (father) Low	Ref.	Ref.	Ref.	Ref.
Medium	0.052	0.015	0.013	0.106**
	(0.035)	(0.027)	(0.013)	(0.034)
High	0.169**	0.077**	0.024	0.182**
	(0.040)	(0.030)	(0.017)	(0.045)
Work intensity (mother)	-0.023	-0.096**	-0.009	0.037
	(0.031)	(0.026)	(0.014)	(0.023)
Work intensity (father)	-0.009	-0.017	0.083*	0.078*
	(0.043)	(0.035)	(0.037)	(0.030)
Variance (Country)	0.289	0.220	1.552	1.261*
	(0.194)	(0.123)	(1.066)	(0.613)
N	2216	3518	3357	3646
Deviance (-2 ll)	2788	4304	2796	3460
ICC	.081	.063	.321	.277

Average Marginal Effects and s.e in parantheses; * $p < .05$, ** $p < .01$, fixed effects for years not shown

The analysis by regions reveals a number of interesting findings. While there is little variation between countries in the Core and Nordic regions, the same cannot be said for the

Southern and Eastern European regions. Furthermore, considerable differences in predictors of marital status at the time of birth of the first child can be observed between these regions.

In the Nordic region the most important predictors of marital status appear to be age and whether fathers have tertiary education. In regards to mothers' education, I find that mothers with medium levels of education are those least likely to be married. In the Core Europe region I observe a similar pattern for the effects of age and education. However, the age effect is more pronounced than in any other region. I also find that those who own their home are significantly more likely to be married. Additionally, an independence effect can be observed for mothers' work intensity. In Southern Europe the effect of age on the likelihood of being married is less pronounced. I also observe a positive effect of home ownership, mothers' education and fathers' work intensity. In Eastern Europe, the age effect is least pronounced and I find very strong positive effects for both parents education and for fathers' work intensity. These findings clearly indicate that childbearing in cohabitation in Eastern Europe is more strongly associated with economic disadvantage than in other regions. In order to explore whether these differences between regions can be explained through the factors considered here, I will later specify models which includes region dummies. In a next step random slopes and country level variables will be introduced into the model. These models will build on model 7, but will not include educational combinations, relative work intensity or earnings.

A look at the work intensity variables also reveals interesting results, which come as a bit of a surprise considering the results from the integrated model. For mothers' work intensity the only significant effect can be observed in Nordic countries, and as the independence hypothesis would predict it is negative. For fathers' work intensity significant positive effects can be observed in the Southern and Eastern European regions. I observe no effect in the Nordic and Core Europe regions. This might be due to the far lower degree of variation in this variable in these regions compared to Southern and Eastern Europe.

4.2.5 Random Slope Models

In order to consider individual and context effects, this analysis will resort to multilevel analysis (Hox 2010; Snijders and Boskers 2011), and in this step consider not only micro-level covariates but also country level variables (level two) in the regression. Additionally, random slopes are introduced in order to model the variation in individual level variables between contexts. I attempt to specifically model this variation by introducing cross level interaction effects. I will also consider differences between country groups by introducing region dummies into these models. Here the objective is to better understand which factors can explain differences between regions.

A central objective of this thesis is to examine whether the effect of parents' socioeconomic resources varies between contexts. Multilevel-modelling can test these assumptions by allowing the slope of a level one variable to vary between level two units, i.e. in this case countries. Before moving on to the interpretation of model results, I will discuss the criteria guiding the inclusion of random slopes. For the analysis at hand, the specification of random slopes was a bit problematic. The standard text book procedure, of first specifying a model with all the fixed parts, then testing for random slopes of level 1 variables, and

then simultaneously introducing all significant random slopes (compare for example Hox 2010), was not feasible with the data at hand. Graphical examination of country regression lines and likelihood ratio tests, indicate that for all explanatory variables, with exception of home ownership, the estimation of random slopes would be preferable. However, when attempting to model random slopes for all level one predictors, I find that the model does not converge. This is likely due to the low level of variance of a number of random slopes, and the relatively small number of level two units which limits the degrees of freedom at the macro-level (Stegmüller 2013; Barr et al. 2013). Thus, the specification of random slopes was guided by theoretical considerations. Following advice provided by Barr et al. (2013) I attempted to specify the maximum possible random structure, and will outline here shortly which random slopes are assumed on the basis of theory, and tested for step by step in simplified models (see Table A.13 in Appendix D).

Both the independence and status attainment hypothesis assume variation over contexts, and predict specific cross level interactions. For the independence hypothesis the operationalization was fairly straight forward, as I assume that the effect of mothers' labor market relevant resources will be dependent on compatibility of work and family life. The specification of random slopes for mothers' education showed significant variation between countries for mothers' with high levels of education. The other micro-level variable associated with the independence hypothesis is mothers' work intensity. However, since it is measured for the year prior to the survey, it assesses women's labor force attachment when they are not yet with child. From a theoretical perspective, it does not make sense to assume that the effect of this variable is dependent on the compatibility of work and family life.

The status attainment hypothesis predicts that as acceptance of alternate family forms increases, the effect of social status on the likelihood of being married should increase. Three variables serve as indicators of social status in this study: home ownership, income and education. For home ownership no significant random slope can be observed in simplified models. The specification of a random slope for the income variable showed that there is slight variation of the income effect between countries. As mentioned above, a significant random slope for mothers' education can be observed, yet I find no significant random slope for fathers' education. Thus, the random part of the model was specified to allow for variation in the slopes for mothers' education and the income variable. This specification allows me to test the most central cross level interactions. Furthermore, such a specification allows the model to converge. However, this specification does not allow me to test the cross-sectional assumption of the status attainment hypothesis for all level one variables. Specifically, it was not possible to examine a cross level interaction between fathers' education and acceptance in the final model.[44]

Additionally, when specifying the random part of a multilevel model, the covariance of the random slopes and intercepts has to be considered. While theoretically the specifica-

44 As a significant random slope is not a necessary precondition for identifying cross level interactions (LaHuis and Ferguson 2009), I also tested for cross level interactions for the variables discussed above in models with individual random slopes (see Tables A.13 and A14 in Appendix D). I did observe a significant cross level interaction for fathers' education, but the effects are so small that they do not allow discriminating between education groups.

tion of covariances did not appear necessary, I did specify a model which included them in addition to random slopes. As none of them was significant I omitted them for reasons of model parsimony. Furthermore, excluding the covariances does not affect the substantial model results. Table 4.13 presents the results for models which include random slopes. Note that as in Table 4.11 coefficients for the year fixed effects are excluded. Additionally, the coefficients for the age of mothers and age differences are not shown. The Appendix D includes a table which shows the average marginal effects for this model.

In model 8 random slopes for medium and high levels of mothers' education are included. I find that the effect of high levels of mothers' education varies significantly between countries. No significant variation can be observed for the effect of medium education. When comparing model 8 to model 7 I observe slightly larger logit-coefficients for both education groups, yet the effect for medium education remains insignificant. Thus, it appears that it is mainly women with high levels of education whose marriage likelihood varies between contexts. The inclusion of these random slopes also leads to a considerable decrease in the ICC (from .323 in model 7 to .276). This indicates that variation in the effect of mothers' education can explain variation between countries. The inclusion of the random slopes also leads to a decline in the deviance statistic, and an LR-Test indicates that this improvement in model fit is significant. Model 9 includes a random slope for the income variable. The variation in the effect of household income is significant, and leads to an improved model fit, as witnessed by the decrease in the deviance statistic. With the inclusion of the random slope for the income variable, the variance for mothers' education becomes far smaller and is no longer significant. Furthermore, I observe an increase in ICC.

In a next step, the random slope model is expanded by introducing a number of country level predictors. Model 10 includes the child care enrolment rate, which is associated with the independence hypothesis, and is intended to model the compatibility of work and family life. As expected, a significant negative effect on the likelihood of being married can be observed for the child care enrolment variable. Comparing model 10 to model 9, I observe a minor decrease in the deviance statistic, and the ICC drops from .300 to .220. Apparently, differences in availability of child care substantially contribute to variation in likelihood of parents being married between countries.

Table 4.13 Random slope models

	m 8	m 9	m 10	m 11	m 12	m 13	m 14
Equivalized income	-0.002 (0.001)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
Home ownership	0.236** (0.050)	0.242** (0.050)	0.244** (0.050)	0.242** (0.050)	0.243** (0.050)	0.244** (0.050)	0.245** (0.050)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.077 (0.117)	0.052 (0.097)	0.048 (0.094)	0.058 (0.097)	0.055 (0.096)	0.049 (0.097)	0.095 (0.082)
High	0.417** (0.135)	0.364** (0.105)	0.360** (0.100)	0.329** (0.102)	0.329** (0.101)	0.324** (0.101)	0.432** (0.091)

	m 8	m 9	m 10	m 11	m 12	m 13	m 14
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.169** (0.065)	0.178** (0.065)	0.175** (0.065)	0.172** (0.065)	0.173** (0.065)	0.175** (0.065)	0.169** (0.065)
High	0.505** (0.077)	0.518** (0.077)	0.517** (0.077)	0.514** (0.077)	0.515** (0.077)	0.517** (0.077)	0.515** (0.077)
Work intensity (mother)	-0.165** (0.064)	-0.140* (0.065)	-0.137* (0.065)	-0.137* (0.065)	-0.136* (0.065)	-0.135* (0.065)	-0.143* (0.064)
Work intensity (father)	0.268** (0.086)	0.256** (0.086)	0.258** (0.086)	0.260** (0.086)	0.272** (0.087)	0.273** (0.087)	0.264** (0.087)
Child care enrolment			-0.039** (0.011)	-0.015 (0.011)	-0.012 (0.011)	-0.005 (0.011)	0.015 (0.014)
Acceptance				-0.048** (0.012)	-0.048** (0.012)	-0.030* (0.013)	-0.026 (0.017)
Unemployment rate					0.027 (0.015)	0.027 (0.015)	0.027 (0.015)
Gender role attitudes index						-0.080* (0.035)	-0.084* (0.039)
Educ.(m) medium*Child care							-0.015* (0.007)
Educ.(m) high * Child care							-0.029** (0.007)
Educ.(m) medium *Acceptance							-0.011 (0.007)
Educ.(m) high * Acceptance							0.004 (0.008)
Equivalized income*acceptance							-0.000 (0.000)
Constant	0.639* (0.252)	0.653* (0.263)	0.654** (0.225)	0.629** (0.192)	0.651** (0.190)	0.650** (0.180)	0.645** (0.193)
Variance (Educ.(m) medium)	0.177 (0.101)	0.082 (0.057)	0.072 (0.048)	0.099 (0.064)	0.096 (0.062)	0.097 (0.063)	0.000** (0.000)
Variance (Educ.(m) high)	0.238* (0.113)	0.071 (0.054)	0.052 (0.043)	0.066 (0.064)	0.065 (0.062)	0.062 (0.064)	0.025 (0.031)
Variance (Equivalized income)		0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.000** (0.000)	0.012 (0.022)
Variance (Country)	1.257** (0.389)	1.409** (0.424)	0.928** (0.282)	0.611** (0.192)	0.590** (0.186)	0.480** (0.156)	0.588** (0.185)
Deviance (-2 ll)	13592	13543	13533	13517	13514	13509	13488
ICC	.276	.300	.220	.157	.152	.127	.151

Logit coeff. s.e. in parentheses; N=12748; * p < .05, ** p < .01; year fixed effects, age and age diff. not shown

Model 11 additionally includes the attitudinal indicator acceptance of nontraditional family forms, which measures the percentage of the population agreeing with the statement "It is okay to live together without being married." This variable will be employed to model

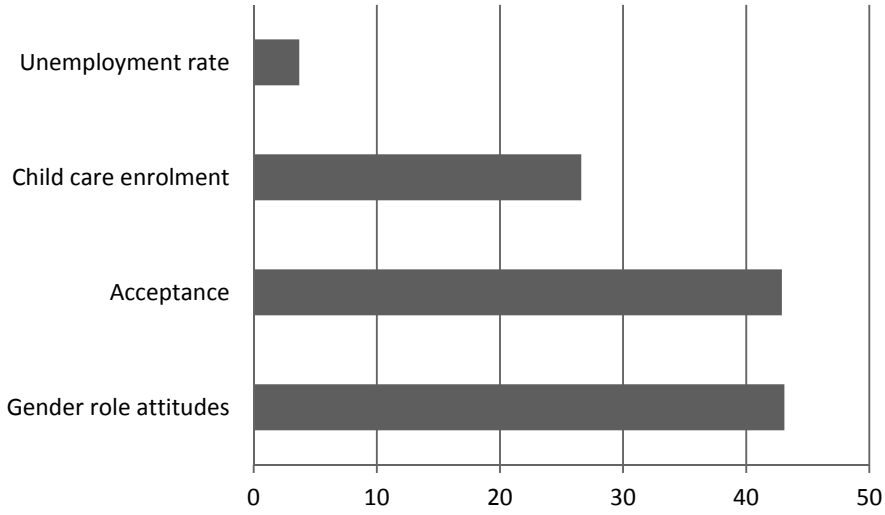
the contextual nature of status attainment. I observe a significant negative effect for this predictor. The inclusion of this macro-level variable leads to a reduction in both the intraclass correlation and deviance. However, I also find that with inclusion of acceptance of nontraditional family forms, the effect of child care enrolment is drastically reduced and is no longer statistically significant. This is likely due to the high level of correlation between these two indicators (.717).

The next model seeks to test the uncertainty hypothesis by including a country level unemployment indicator. This indicator was calculated by calculating the mean of the unemployment rate over the previous four years. Contrary to the predictions of the uncertainty hypothesis, the effect of country level unemployment on the likelihood of living in a marital versus cohabiting union is actually negative. However, this effect is not significant and rather small in magnitude. While both the deviance statistic and the ICC decrease, both changes are rather small compared to the impact of the other level two predictors. A Likelihood Ratio test indicates that the inclusion of the unemployment rate does not lead to a significant improvement of model fit (at the .05 level). This finding must be interpreted as rejection of the uncertainty hypothesis. This result stands in contrasts to the evidence provided in Section 4.1. In the TSCS model changes in unemployment are positively associated with changes in the non-marital fertility ratio.

Model 13 includes gender role attitudes as a country level predictor. This variable was generated by combining a number of attitudinal indicators on women's position in the labor force and takes on values from 0 to 100, with higher values reflecting higher approval of egalitarian gender roles in society. As the gender equality hypothesis predicts, a significant negative effect for the gender role attitudes indicator can be observed. This finding is in line with the assumption that higher levels of gender equality reduce the likelihood of parents to be married. Furthermore, the inclusion of the gender role attitudes indicator leads to a slight but significant reduction in the deviance statistic, and a sizeable drop in the ICC. Thus, the introduction of the four country level predictors has reduced the initially observed intraclass correlation by more than half.

With the introduction of the gender role attitudes indicator, the coefficients of child care enrolment and acceptance of non-traditional family forms are considerably reduced. As argued above, this seems to be a consequence of the high levels of correlation between these three variables (all over .7). The finding that of these three strongly correlated variables, it is the gender roles indicator that carries the most explanatory weight provides further backing for the gender equality hypothesis. This result is in line with the findings from Section 4.1, where a strong effect of gender role attitudes on the non-marital fertility ratio is observed.

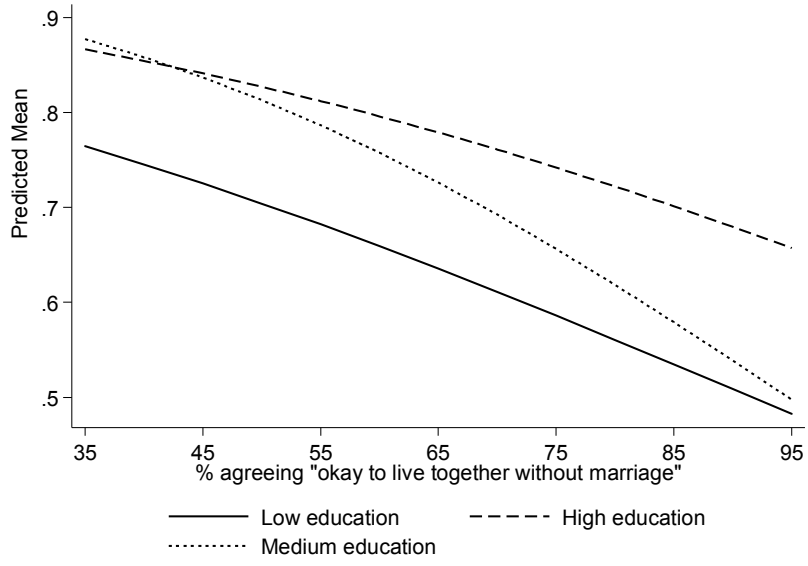
In order to examine which of the country level variables can best explain variation between countries, I reran models with one country level variable at a time, and calculated the proportion of ICC explained for each model. The decreases in ICC in percent relative to model 9 are plotted in Graph 4.23. I find that the two attitudinal indicators, acceptance and gender role attitudes are best suited to explain variation between countries. The child care participation rate also provides a considerable contribution to explaining variation. The effect of unemployment is negligible.



Graph 4.23 Proportion of ICC explained by country level variables (in %)

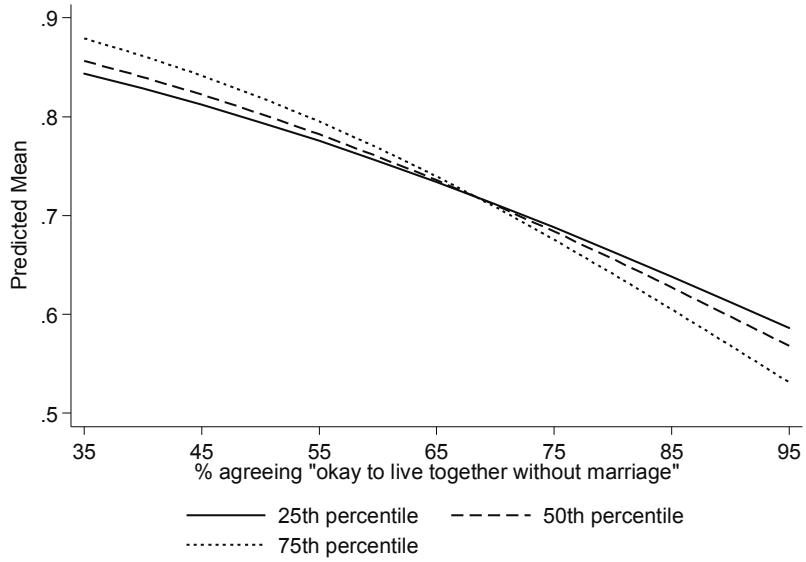
Exploring Cross Level Interactions

In the final step of this analysis, cross level interactions will be specified. They are intended to test the contextual assumptions of the specialization and status attainment hypotheses. Model 14 introduces three cross level interaction effects. Their introduction leads to a minor decrease in the deviance statistic, which indicates an improvement in model fit. Furthermore a minor increase in the ICC relative to model 13 can be observed.



Graph 4.24 Interaction mothers' education and acceptance

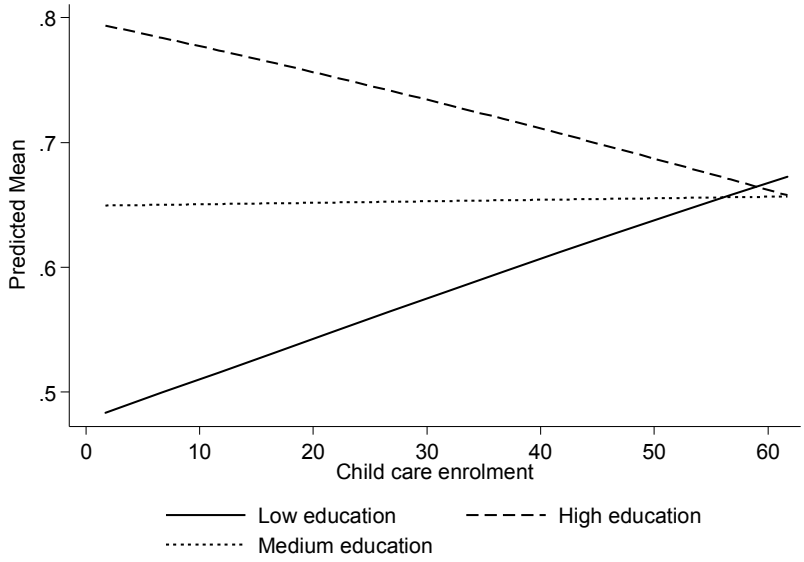
The contextual nature of status attainment was examined, by interacting mother's education and household income with the country level variable acceptance of non-traditional family forms. I assume that in more tolerant contexts, the effects of social status should be more pronounced. When examining the interaction between acceptance and education, no significant interaction term can be observed. Graphical examination of this association (Graph 4.24), gives the impression that differences between mothers with high education and the other education groups increase as acceptance levels rise. The same cannot be said for the comparison of mothers with medium and low levels of education. However, the model cannot statistically confirm these observations. Likewise, no significant interaction can be observed for the income and acceptance variables. Graph 4.25 shows this interaction for the 25th, 50th and 75th income percentile. Based on theory, I would expect that differences in likelihood of being married at different levels of the income distribution increase as acceptance increases. However, the contrary is the case, as it appears that marriage likelihood of high income couples is actually the lowest in contexts with high degrees of acceptance. While for the education variable, a very optimistic reading of results might interpret them as partial confirmation of the contextual nature of status attainment, the association between income and acceptance of non-traditional family forms cannot be interpreted in this light. In conclusion, the assumption that the effect of status attainment becomes more pronounced in more tolerant contexts must be rejected.



Graph 4.25 Interaction income and acceptance

The independence hypothesis assumes that the independence effect of mothers' education should be more pronounced in contexts with high levels of compatibility of work and family life. Thus, an interaction between mothers' education and child care enrolment is estimated. I assume that mothers can more easily reconcile children and work when child care is available. Indeed, I find significant negative interactions for the high and medium

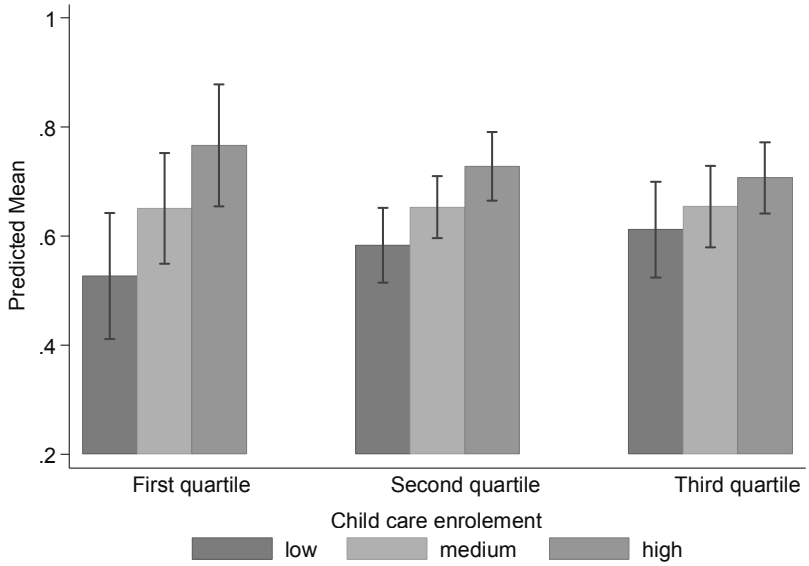
education categories, indicating that the availability of child care leads to a decrease in the likelihood of mothers' with medium and high education to be married. This effect is more pronounced for mothers with high education, indicating that differences between the medium and high education categories should decrease as the rate of child care enrolment increases. A look at Graph 4.26 confirms this assumption. The continuum on the x-axis covers the actual values observed for childcare enrolment for all countries under study. In countries with little institutionalized child care (on the left hand side), I observe a clear ordering in likelihood of being married by mothers' education. Here, mothers with high education are most likely to be married, and mothers with low levels of education are least likely to be married. On the other end of the continuum, the difference in likelihood of being married between the educational groups is very small.



Graph 4.26 Interaction mothers' education and child care enrolment

However, as the confidence intervals around the predicted values are very large, great care must be taken when interpreting the differences in the predicted means for the three education groups. Graph 4.27 below plots the predicted means at the first, second and third quartile of the child care participation variable with confidence intervals. These are extremely large at the first quartile, where they almost overlap for low and high education, despite the difference in the predicted values being larger than 20 percentage points. It becomes apparent from Graph 4.27 that the differences between low and medium, and medium and high education are not significant at the first second or third quartile. As Graph 4.26 indicated, no significant differences between the likelihood of marriage in context with high availability of child care can be observed for the different education groups. Significant differences in likelihood of being married can be observed for mothers with high and low levels of education at the first and second quartile of child care enrolment. These differences are not significant in contexts with high levels of child care availability.

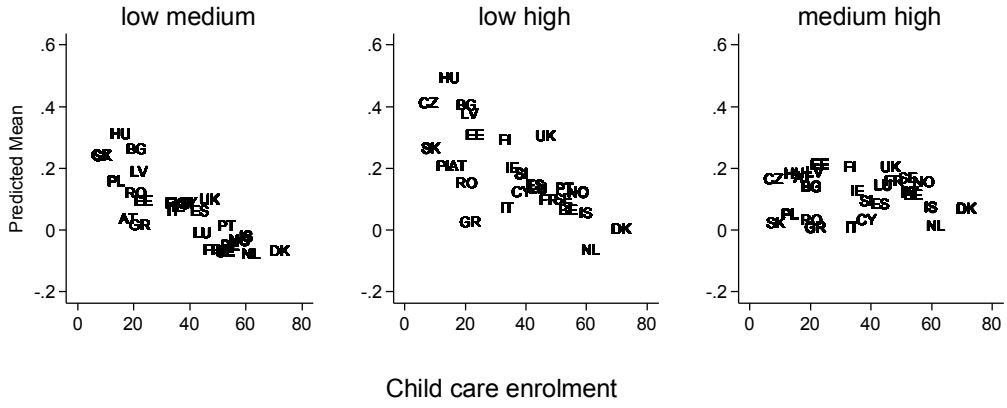
This finding supports the assumption that the effect of mothers' education is dependent on context. However, differences are only significant when comparing high and low levels of education.



Graph 4.27 Mothers' education and child care enrolment

In an attempt to further explore the relationship between availability of child care, education, and mothers' likelihood of being married, Graph 4.28 plots the difference in the predicted mean values for the three education groups by country against the child care enrolment rate. The plot on the left hand side includes differences between mothers with low and medium education. A very clear negative relationship (correlation of -.83), can be observed, indicating that differences between these education groups are far less pronounced in countries with high availability of child care. The same holds true when comparing mothers with low and high education. While the association is not as strong (correlation of -.66) overall differences are slightly larger. When comparing mothers with medium and high levels of education, no pattern can be observed (correlation of .01). These results support the idea that the effect of mothers' education on having a child in a marital versus a cohabiting union is indeed contextual. However, the model's confidence in predicting differences between education groups is not very high. In sum, the results presented here, provide considerable evidence for my theoretical assumptions.

Explaining Differences between Country Groups



Graph 4.28 Differences between education groups

Before moving on to diagnostic tests, I will attempt to examine how well the chosen model specification can explain differences between country groups. Based on the results presented in Table 4.12, I have reason to believe that there is considerable variation in the importance of different individual level predictors between country groups. Table 4.14 summarizes the results from a number of regression models. The table indicates, whether the likelihood of marriage is higher in a given country group than in others, and whether these differences are significant. The table should be read by comparing row headers with column headers, e.g. for the empty model I find that parents in the Eastern European country group are significantly more like to be married that parents in the Nordic country group. Parents in the Nordic country group are less likely to be married than those living in the Core country group. This difference is not significant, however. This information was calculated for an "empty" model, which includes only the year fixed effects analogous to model 1, a model which includes all micro-level predictors analogous to model 7, and finally a model which, similar to model 13, includes random slopes for household income and mothers' education, and the four country level predictors child care enrolment, acceptance, unemployment and gender roles.

For the empty model, I find that likelihood of marriage is lowest in the Nordic countries, followed by the Core, East and South country groups. Differences between Nordic and South as well as East are significant. Parents in the Core country group are less likely to be married than parents in Southern Europe, but no significant difference between the Core and East country groups can be observed. The differences between the Southern and Eastern European country groups are also not significant. The same is largely true for the model which additionally controls for the household and individual characteristics of parents, indicating that differences between country groups are not attributable to composition effects. This finding mirrors the results regarding the changes in ICC discussed above.

When comparing the results of the micro model to the macro model, a number of differences become apparent. After controlling for random slopes and country level predictors, the likelihood of marriage is actually lowest in the Eastern European country group. How-

ever, the difference between this group and the Nordic and Core groups are not significant. In sum, the only significant differences observed after controlling for country level conditions are those between the Southern European country group and the Eastern and Core Europe country groups.

Table 4.14 Differences between country groups for different models

Empty model	Nordic	Core	South	East
Nordic	X	-	-*	-*
Core	+	X	-*	-
South	+*	+*	X	+
East	+*	+	-	X
Micro model	**Nordic**	**Core**	**South**	**East**
Nordic	X	-	-*	-*
Core	+	X	-*	-
South	+*	+*	X	+
East	+*	+	-	X
Macro model	**Nordic**	**Core**	**South**	**East**
Nordic	X	-	-	+
Core	+	X	-*	+
South	+	+*	X	+*
East	-	-	-*	X

How to read this table: Parents in (row header) are more (+) or less (-) likely to be married than parents in column header. Difference is significant at .05 level (*).

In order to disentangle which country level variables are chiefly responsible for explaining the differences between country groups, I estimated models which separately tested the effect of macro-level covariates. The results of these models are summarized in Table 4.15. I will examine the patterns observed for each macro-level variable relative to that of the micro model to better understand the impact of each country level predictor.

The inclusion of child care enrolment further emphasizes the differences between the Southern European country group and the other regions. On the other hand, the differences in likelihood of marriage observed between the Nordic and Eastern European regions can largely be explained after including child care enrolment in the model.

Including the acceptance towards cohabitation in the model, I observe a number of changes. On the one hand, including this variable emphasizes the differences between Nordic and Core countries, but differences observed between Nordic and Eastern countries are no longer significant. On the other hand, inclusion of the acceptance indicator can explain differences between the Core and Southern European country groups. After including this indicator, I also observe significant differences between the Eastern and Southern Europe country groups.

Factoring out unemployment levels further emphasizes the differences between the Nordic countries and the other country groups. The inclusion of gender role attitudes has exactly the opposite effect. After the inclusion of this indicator, no significant differences between Nordic countries and other country groups can be observed. This is a somewhat remarkable finding, as it indicates that the defining difference between the Nordic countries and the remainder of Europe are the more egalitarian attitudes in regards to the relationship of the sexes. Indeed, it appears that of the employed country level covariates the gender role attitudes index is best suited to explaining differences between regions, as I only observe significant differences between the Core and Southern European regions in this model.

Table 4.15 Differences between country groups for models considering macro variables

Child care	Nordic	Core	South	East
Nordic	X	-	-*	-
Core	+	X	-*	+
South	+*	+*	X	+*
East	+	-	-*	X
Acceptance	**Nordic**	**Core**	**South**	**East**
Nordic	X	-*	-*	-
Core	+*	X	-	+
South	+*	+	X	+*
East	+	-	-*	X
Unemployment	**Nordic**	**Core**	**South**	**East**
Nordic	X	-*	-*	-*
Core	+*	X	-*	-
South	+*	+*	X	+
East	+*	+	-	X
Gender Role Atti.	**Nordic**	**Core**	**South**	**East**
Nordic	X	-	-	-
Core	+	X	-*	-
South	+	+*	X	+
East	+	+	-	X

How to read this table: Parents in (row header) are more (+) or less (-) likely to be married than parents in column header. Difference is significant at .05 level(*).

In summary, this analysis confirms, what the analysis by country group indicates. Significant differences between country groups, in regards to the likelihood of living in marital versus a cohabiting union at the time of childbirth can be observed. While the Nordic and Core European country groups appear to be fairly similar, parents in the Southern

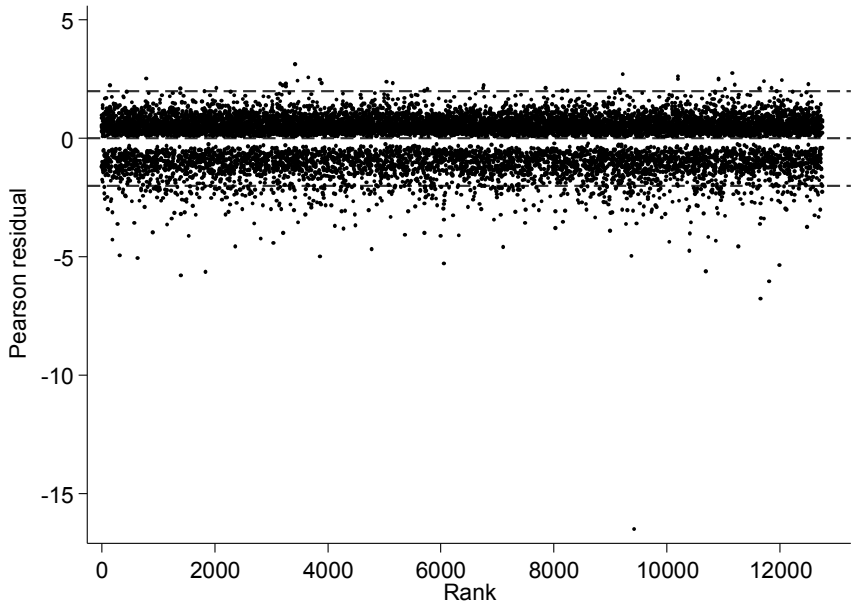
European country group are far more likely to be married than mothers in other country groups, even after controlling for differences in institutional arrangements, labor markets and attitudes. Apparently, the employed macro-level covariates are well suited to explaining behavior in the Eastern Europe region. However, the same cannot be said for Southern European countries. I'd argue that this is likely due to the fact that, while likelihood of being married at the time of childbirth is much higher in this region, attitudes aren't actually that much more traditional than in other regions. In relation to acceptance of cohabitation, people in Southern Europe are actually more tolerant than people in Eastern Europe. Similarly, attitudes regarding gender roles are less traditional in Southern Europe than in Eastern Europe. Overall, these results mirror the findings from the TSCS analysis, which indicated that model fit for countries in Southern Europe, with extremely low rates of non-marital fertility, was poor.

When seperately examining the effect of indivdual country level predictors I find that the inclusion of the unemployment variable actually emphasizes the differences between countries. Furthermore, differences in gender roles between countries can explain almost all observed differences between country groups specifically those between the Nordic countries and the other parts of Europe.

4.2.6 Model Diagnostics

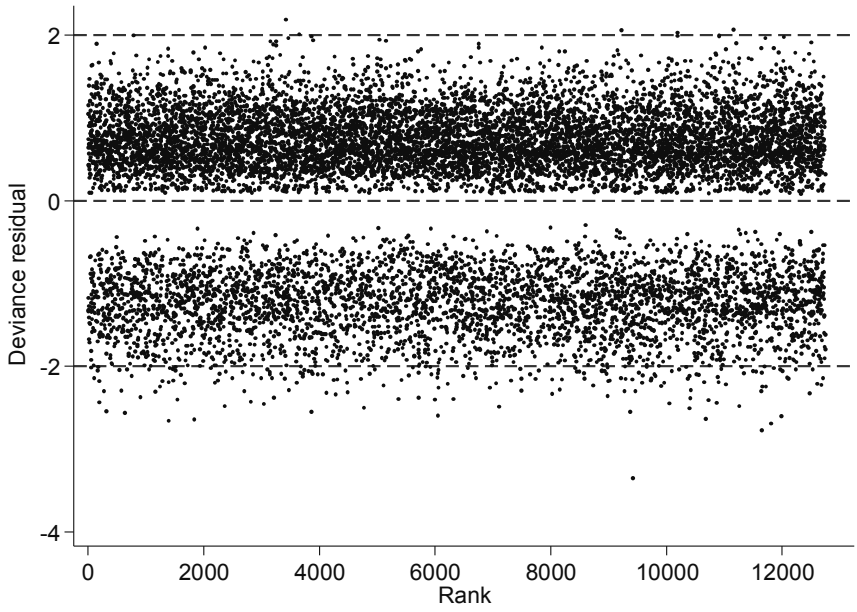
In order to examine the fit of the chosen model specification, a number of diagnostics tests are conducted at the micro- and macro-level. These tests seek to identify cases for which the model predictions are imprecise, and to observe whether there are any patterns in the residuals. Following advice by Snijders and Berkhof (2008), I will begin with the examination of the level one residuals and move on to the level two residuals.

At the individual level, Pearson and deviance residuals are examined, in order to better understand where the model predictions are off, and whether patterns among residuals exist. Graph 4.29 and 4.30 plot the Pearson and deviance residuals. Unlike in ordinary least squares regression, where residuals should be normally distributed, no such assumptions are made in logistic regression which relies on maximum likelihood methods. Thus, I chose to plot residuals against a randomly distributed rank variable. The Pearson residuals are calculated by subtracting the predicted values from the observed values and dividing them by the standard deviation. Agresti (2002) recommends that observations with absolute values greater 2 warrant closer examination.



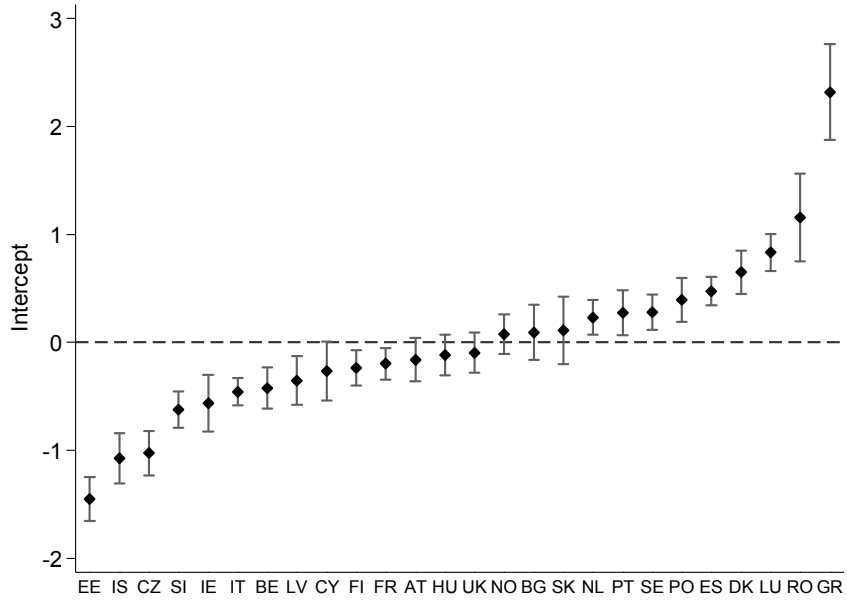
Graph 4.29 Level 1 Pearson residuals

When examining Grapy 4.29, I find that the residuals for the answer category 1 (married) rarely exceed values of 2 (the cut-off value in this graph), and that high residual values are more common for those living in cohabiting unions when the first child is born. Overall, 36 cases have a residual greater than 2 while 444 cases have a residual smaller than -2. At the lower end of the scale, a number of extremely large residual values can be observed. Generally, the model does a better job at correctly predicting whether a couple is married, than whether it is cohabiting. A more detailed examination of observations with an absolute value of the Pearson residual greater 2 reveals that large proportions of high residuals can be observed in countries with low rates of cohabitation for cohabiting couples. Similarly, those few cases with residuals over 2 tend to be married couples from countries with high levels of cohabitation. When examining individual characteristics of cases with high residual values, another pattern becomes apparent: it is mainly cohabiting couples with high levels of education and high levels of labor force orientation for which the model seems to fit poorly. This might be due to the model not being able to fully reflect the contradictory effects of mothers' education as argued in the independence hypothesis.



Graph 4.30 Level 1 Deviance residuals

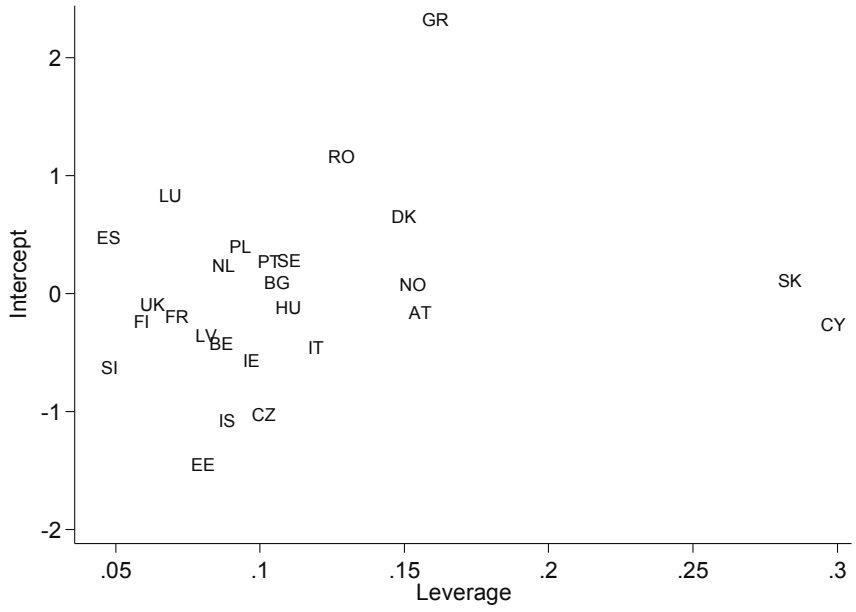
The second type of residual examined at the micro-level is the deviance residual. Deviance residuals are calculated by assessing an observations' effect on the log likelihood. In fact, the sum of the squared deviance residuals adds up to the deviance statistic, which was employed as a measure of model fit in the preceding analysis. McCullagh and Nelder (1989) and Hardin, Hilbe and Hilbe (2007) recommend deviance residuals for the examination of generalized linear models. While I observe fewer extreme outliers in this plot than for the Pearson residuals, the general pattern is somewhat similar. Higher residual values can be observed for cohabiters. A look at the cases with high deviance residuals further emphasizes one of the previous observations. Most cases with high residuals are highly educated cohabiters, most of which are already older than 30. However, I do not observe the other pattern evident for Pearson residuals that married couples in countries with high levels of cohabitation have high residual values.



Graph 4.31 Error bar plot of level 2 residuals

Moving on to the macro-level, Graph 4.31 shows the level 2 residuals and their standard errors in the form of an error bar plot. Following the example presented by Hox (2010), confidence intervals are specified so that non overlapping confidence intervals indicate that residuals are significantly different from each other at the 5% level. These confidence intervals are calculated by multiplying the standard errors by 1.39. Overall, considerable country level variation in the level of residuals can be observed. Model predictions seem to be most imprecise for Greece, Romania, Estonia, Island and the Czech Republic. Greece, much like in the time-series cross-section analysis, is the most extreme outlier. In order to ascertain whether the observed residuals are problematic for the model estimation, I calculated the leverage[45] for level 2 units and plotted it against the residuals in Graph 4.32. The cut-off value for problematic cases for the leverage statistic is defined as 2p/n, where p is the number of random terms and n is the number of units at the respective level. For the model at hand, with 3 random slopes, 1 random intercept and 26 countries it is 8/26=.308. When examining Graph 4.32, I find that while the residual for Greece is problematic, the value for the leverage statistic is under the cut-off value. The leverage values for Cyprus and Slovakia are considerably higher, albeit also below the cut-off value. Thus, while model fit at the country level is low for some countries, most notably for Greece, the overall model specification is not overly sensitive to outliers.

45 The leverage is calculated with the help of the runMLwiN ado (Leckie and Charlton 2013).



Graph 4.32 Leverage-residual plot

In order to further examine the effect of outliers on estimation results, I reran models excluding one country at a time, and compared the coefficients of the predictor variables to the full model. I report here only cases where a sign change occurred, or where significance of effects changed at the .05 level. The results of models which exclude individual countries are included in Appendix D.

The effects of micro-level variables appear to be fairly stable when excluding individual countries. While a number of coefficients changed in magnitude I only observed changes in significance for one variable in a number of models: mothers' work intensity. The effect became insignificant at the .05 level after excluding Belgium, France, Italy, Luxembourg and Austria. The effect of all other substantial micro-level variables was robust to model respecification.

For the macro-level variables, the exclusion of a single country can have a far more profound effect on estimators, and indeed considerable variation in results can be observed. The exclusion of Greece impacted the acceptance indicator, for which a highly significant negative effect can be observed. However, in the model excluding Greece the effect of the gender role attitudes indicator is no longer significant. A look at the descriptive statistics for these two variables reveals that they are strongly correlated (.76) and that Greece while ranking fairly highly on the acceptance indicator, is one of the countries with the lowest values on the gender role attitudes index. The exclusion of Greece leads to a better fit for the acceptance indicator relative to the gender role attitudes indicator, which results in the gender role attitudes indicator no longer being significant. A further macro variable which is affected by the exclusion of Greece is the unemployment rate, which becomes significant and shows a positive effect. In fact, I find a significant positive effect for unemployment after excluding Portugal, Finland, Sweden, Hungary, Latvia, Poland and Norway. This find-

ing further increases doubts about the validity of the uncertainty hypothesis. For the cross level interaction effects, I find that results are fairly stable. The effect for the interaction between medium education and child care enrolment becomes insignificant when Cyprus, Latvia or Poland is excluded.

Thus, while the micro-level results seem to be very stable, the effects of level two variables are somewhat sensitive to outliers and this needs to be considered when interpreting results in regards to the uncertainty and gender equality hypotheses.

4.2.7 Aside: Single Mothers

While the focus of this dissertation is placed on couples, and their decision to be married or cohabiting at the time of childbirth, the data on which I based my analysis also allows me to compare single mothers to those living in partnerships. These groups will be compared on the basis of multilevel multinomial logistic regression models which compare single, cohabiting and married mothers. Father characteristics are not considered here as this information is unavailable for single mothers. As Graph 4.10 showed, there is considerable variation across countries in the proportion of births to single mothers. Table 4.16 provides an overview of the distribution of family forms by country groups. The group of single mothers is by far the smallest of all family forms, and overall there are only 1852 cases in all 26 countries under study. At 16.1 percent the weighted proportion of single mothers is far larger in Eastern Europe than in any other region. In these countries, the proportion of single mothers is actually larger than the proportion of cohabiting mothers. The proportion of single mothers is lowest in Southern Europe. However, the difference between Southern European and Nordic countries is not overly large.

Table 4.16 Distribution of family forms by country groups[46]

	Married	Cohabiting	Single	Total N
Nordic	42.4	49.1	8.4	2541
Core	48.7	40.2	11.1	4148
South	76.3	16.6	7.1	3649
East	68.6	15.3	16.1	4597
Weighted %	60.1	29.3	10.6	100
Total N	8581	4502	1852	14935

While the hypotheses formulated in Chapter 2 were developed with the distinction between married and cohabiting couples in mind, some might also be applicable when studying single mothers. This is likely the case for the uncertainty hypothesis as the underlying argument is similar to that proposed by Wilson (1987) in his marriageability hypothesis. According to Wilson a lack of economically attractive (marriageable) men in the urban

46 As explained above, the sample of mothers in the EU-SILC is somewhat biased in regards to education. Thus, these statistics should not be seen as representative.

black population in the United States, led to increases in the proportion of female headed households. I would expect that in situations with high unemployment women are more likely to have a child with a partner who is not employed and might prefer to forego a union if the father is unable to make a significant contribution to the family's finances. This mechanism should likely apply when comparing single mothers to cohabiting and married mothers.

The independence hypothesis assumes that mothers with higher levels of labor market specific capital are less dependent on the financial protection provided by marriage, and should instead seek less binding commitments. This argument could also apply to the distinction between single and married mothers. However, I argue that this mechanism is unlikely to be observed for this dichotomy, due to the second key assumption of the independence hypothesis. For an independence effect to be observable, mothers need to be able to utilize their labor market specific capital. Here a single parent should be at a disadvantage compared to partnered women in most circumstances. Thus, I do not expect the independence hypothesis to be applicable to the distinction cohabiting versus single.

The status attainment hypothesis posits that higher levels of social status should be associated with being married at time of childbirth, due to the symbolic value attached to marriage, and its insurance function. This argument is easily applicable to the distinction between married and single mothers. However, it is not so much applicable to the distinction between cohabiters and single mothers, as the argument emphasizes the symbolic value of marriage. However, there exists sufficient empirical evidence that single mothers tend to be younger, and belong to more socioeconomically disadvantaged groups than partnered mothers (McLannahan 2004). Furthermore, the descriptive statistics outlined in Section 4.2.3 come to similar conclusions. Hence, I expect to find that cohabiters have a higher social status compared to single mothers.

The gender equality hypothesis is derived from arguments proposed by Norris and Inglehart (2004), who argue that higher levels of gender equality lead to increases in non-traditional family forms. Thus, one could assume that in societies with more egalitarian gender roles, more births to single mothers relative to married mothers should be observed. However, as the gender equality argument emphasizes men's role in learning egalitarian gender roles, the argument should not apply to the distinction between cohabiting and single mothers.

Table 4.17 includes results for multinomial logisitic random intercept models which compare single mothers to cohabiting and married mothers. As the distinction between married and cohabiting has been analyzed extensively above, the group of single mothers serves as the reference group for this analysis. Thus, coefficients should be interpreted as likelihood of being cohabiting/married versus single at time of the birth of one's first child. Models are specified using the GLLAMM package (Rabe-Hesketh, Skrondal and Pickles 2004) in Stata 13. The models employ the same variables as above, but since father characteristics are unknown for the single mothers, variables which refer to fathers are not considered. As none of the hypotheses assume variation in effects across countries, no random slopes are specified. This more parsimonious model specification takes into account that the sample of single mothers is far smaller (N=1852) than the sample for cohabiting and married mothers. Models are estimated in three steps: Model 1 estimates the null model

which only includes yearly fixed effects (not shown here); model 2 includes all micro-level variables; model 3 additionally includes all macro-level predictors simultaneously.

Table 4.17 Multinomial models for mothers

	Cohabitation-Single			Married-Single		
	m 1	m 2	m 3	m 1	m 2	m 3
Age (mother)		0.775*	0.844*		2.246**	2.513**
		(0.359)	(0.342)		(0.361)	(0.343)
Equivalized income		0.018**	0.024**		0.023**	0.024**
		(0.005)	(0.004)		(0.005)	(0.004)
Home ownership		0.219*	0.084		0.259*	0.360**
		(0.106)	(0.096)		(0.102)	(0.093)
Education (mother) Low		Ref.	Ref.		Ref.	Ref.
Medium		0.318*	0.435**		0.352**	0.483**
		(0.125)	(0.127)		(0.123)	(0.126)
High		0.575**	0.514**		0.772**	0.992**
		(0.178)	(0.178)		(0.175)	(0.176)
Work intensity (mother)		0.265**	0.238*		-0.086	0.012
		(0.099)	(0.107)		(0.096)	(0.103)
Child care enrolment			0.008			0.012
			(0.005)			(0.103)
Acceptance			0.010*			-0.009*
			(0.005)			(0.004)
Unemployment			-0.016			0.052**
			(0.012)			(0.012)
Gender role attitudes index			0.083**			-0.007
			(0.014)			(0.013)
Constant	1.284**	1.113*	1.284**	2.073**	1.763**	1.969**
	(0.311)	(0.544)	(0.429)	(0.308)	(0.544)	(0.424)
Variance (Country)	0.287**	0.473**	0.395**	0.287**	0.473**	0.395**
	(0.061)	(0.206)	(0.117)	(0.061)	(0.206)	(0.117)
Deviance (-2 ll)	26939	25554	23990			
ICC	.080	.125	.106			

Logit coefficients, s.e. in parentheses; N=14721; * p < .05, ** p < .01; year fixed effects not shown
fixed effects for years not shown, age and age difference not shown

As in the bivariate models above, I calculated intraclass correlation coefficients and deviance statistics. For the deviance statistic I observe sizeable and significant decreases between the null model with year fixed effects (m1 in Table 4.17), the model with only level one predictors (m2), and the full multilevel model (m3). This indicates that in each step the model fit has improved significantly. For the empty model, which only includes the year fixed effects, the intraclass correlation is .080, indicating that 8% of the variation in the dependent variable can be attributed to differences between countries. The inclusion

of individual characteristics does not decrease the ICC, but actually leads to a considerable increase. This indicates that composition effects cannot explain variation between countries. The inclusion of the macro-level factors, which explained considerable variation between countries for the married versus cohabiting dichotomy, does lead to a minor reduction in the ICC from .125 to .106.

Comparing cohabiters and singles in model 2, I find that cohabitating mothers are older, have a higher equivalized income, are more likely to live in their own home and have higher levels of education. All of these differences are statistically significant. Furthermore, cohabiting mothers have a higher likelihood of being involved in the labor market than single mothers. The majority of these effects can still be observed after the inclusion of the country level covariates in model 3. While the magnitude of the effect of tertiary education decreases slightly, the effect coefficients of age, income and medium education slightly increase. The effect for the home ownership variable drops drastically, and is no longer significant. The most likely explanation for this severe change in coefficient is not substantial but statistical. The effect observed in model 2 can likely be attributed to high levels of home ownership in specific countries (see Graph 4.12). The introduction of the country level variables controls for country variation and "explains" differences in home ownership.[47] Examining the effects of level 2 predictors, I observe a positive effect for child care enrolment, but this effect is not statistically significant at the .05 level. A negative coefficient can be observed for the unemployment variable, this is in line with the theoretical assumptions, but the effect is not significant. I do observe a significant effect for the acceptance indicator, which is not surprising as the social stigma associated with cohabitation could be one motivation for mothers (and even more so for fathers) to avoid an unmarried union. Furthermore, I find a significant positive effect for the gender role attitudes index. This means that in contexts with more egalitarian gender roles, mothers of young children are more likely to live in cohabiting unions than without a partner. While I did not predict such an effect, it is not an overly surprising finding, as egalitarian gender roles are the strongest macro-level predictor of living in a cohabiting versus a marital union in my logistic regression models.

Moving on to the comparison of married and single mothers, I find that married mothers are on average older, more likely to live in higher income households, and more likely to live in their own home. These effects are similar to those observed for the distinction between cohabiting and single mothers, but stronger in magnitude. Furthermore, married women are more likely to have medium or high levels of education in comparison to single mothers. In contrast to cohabiters, no significant differences can be observed between married and single women in regards to labor force involvement. Moving on to model 3, I find that the inclusion of country level variables further increases the differences between married and single mothers. The work intensity variable remains insignificant in model 3 as well. No significant effect can be observed for the country level variable child care enrolment. As expected, the effect for the gender role attitudes is negative. However, it is not significant. I also observe a negative effect for the acceptance indicator, where no effect was expected on the basis of theory. As the indicator measures the percentage of population agreeing that it is okay to live together without being married, it is not surpris-

47 This suspicion is confirmed if one specifies a micro model with country fixed effects.

ing that it would be negatively associated with likelihood of being married when a child is born. From a theoretical perspective, the most interesting macro-level variable in this model is the unemployment rate. Contrary to the assumption of the uncertainty hypothesis, higher levels of unemployment are actually associated with a higher likelihood of living in a martial union compared to being a single mother.

One conclusion that can be drawn from this analysis is that the differences between single mothers and mothers living in partnerships are more pronounced, than differences between cohabiters and married couples. Single mothers are on average far younger, less educated and live in households with lower equivalized income than cohabiting and married mothers. These differences are more pronounced when comparing single and married mothers. An obvious difference between the three groups is the level of mothers' work intensity. While there exist no significant difference between the labor force involvement of married and single mothers, cohabiters tend to be more involved in the labor market than the other groups.

When reviewing the impact of the macro-level predictors, the results are not overly conclusive, as I find almost no significant effects, and the employed country level predictors can only explain a very small portion of variation between countries. However, the finding that the country level predictors, which are well suited to explaining differences between cohabiting and married couples, cannot explain variation in single motherhood, is also interesting in and of itself. It indicates that childbearing to single mothers might be the result of different societal boundary conditions than childbearing in cohabitation.

As to the effects observed at the country level, it appears that it is mainly the ideational indicators acceptance and compatibility which can explain differences between cohabiters and singles. I also find that in contexts with high acceptance of nontraditional family forms, the likelihood of mothers to be single relative to living in a marital union increases. The one hypothesis, for which I predict an effect at the macro-level, is the uncertainty hypothesis. For the distinction between cohabiters and single mothers the predicted negative effect can be observed, yet it is not significant. Furthermore, and completely contrary to the theoretical predictions of the uncertainty hypothesis, I actually find that higher levels of unemployment are associated with higher likelihood of mothers to be married relative to being single when a child is born. Thus, much like the comparison between cohabiters and married couples, the results of this analysis do not support the uncertainty hypothesis.

4.2.8 Summary

In conclusion this analysis has yielded a number of interesting results which will be discussed here in light of the hypotheses presented in Chapter 2, and findings from recent research. I will begin with some general observations, before examining findings in regards to the regional variation in parents' marital status at time of childbirth. Finally, I evaluate the evidence concerning my hypotheses.

The focus of the analysis presented here is placed on the comparison of the marital status at the time of birth of the first child. I find substantial differences between the group of married and cohabiting parents. Overall, parents who are married tend to be older and better off economically. However, differences between cohabiting and married couples are

larger in some parts of Europe than in others. While both father and mother characteristics are important in predicting parents' marital status at the time of the birth of a first child, it appears that father characteristics are less context dependent. In regards to single mothers, I find that mothers in this group tend to be younger and at a considerable socioeconomic disadvantage relative to partnered mothers.

The differences between single and partnered mothers are larger than those between cohabiting and married mothers. Furthermore, it appears that the macro-level variables which can explain variation between countries in regards to partnered women's marital status at time of first birth are not well suited to distinguishing between single and partnered mothers.

This analysis shows that there is considerable variation in parents' marital status at the time of birth between countries, and that these differences cannot be attributed to composition effects. In fact, controlling for parents' socio-economic characteristics actually increases variation between countries. The employed country level predictors, child care enrolment, acceptance of cohabitation, unemployment and gender role attitudes can account for about 50% of the observed variation between countries. Of these macro factors the attitudinal variables provide the largest contribution to explaining variation between countries. While child care enrolment also contributes significantly to explaining variation between contexts, the unemployment rate does not. The fact that I find sizeable variation between countries in parents' decision to be married or cohabiting at the time of childbirth, and that a considerable part of this variation can be explained through the introduction of my country level covariates, legitimizes the chosen modeling strategy. However, this conclusion only applies to the comparison of cohabiting and married couples. The same cannot be said for the comparison of single and partnered mothers in Section 4.2.7. For one there is far less variation between countries in likelihood of being a single mother. Also, composition effects are not able to explain this variation, and the explanatory power of the macro-level variables is also much smaller. This finding is interesting, as it shows that country level predictors which explain why cohabitation is chosen as a place for childbearing cannot explain childbearing to single mothers.

The analysis by country groups can shed additional light on differences between contexts. In a first step separate micro-level models for the four ad-hoc country groups Nordic, Core, Southern and Eastern Europe were specified. The intention was to learn whether the effect of micro-level predictors differs by region. One general pattern is that the Nordic and Core European regions appear to be fairly homogenous, with only a small degree of variation observed within these country groups. The same cannot be said for the Southern and Eastern European regions, as the ICC in these groups is close to .3. I also observe significant differences between regions in regards to which micro-level factors can predict the marital status of parents. The Nordic and Core European country groups appear to be fairly similar. In these regions age and fathers' education are the strongest predictors of marital status. In regard to mothers' education, I find that mothers with medium levels of education are those least likely to be married in both the Core and Nordic region. I also observe an independence effect of mothers' work intensity in the Core Europe region. In Southern Europe high levels of fathers' work intensity and tertiary education of mothers seem to be the strongest predictors for being married when a child is born. In Eastern Europe the age effect is least pronounced, and I find very strong positive effects for both parents' educa-

tion and for fathers' work intensity. These findings clearly indicate that childbearing in cohabitation in Eastern Europe is more strongly associated with economic disadvantage than in other regions.

In a second step I examine the effects of region dummies in my multilevel models, in order to understand how well the micro- and macro-level covariates can explain differences between country groups in regard to parents' decision to be married or cohabiting at the time of childbirth. I find that the Nordic and Core Europe group are fairly similar, and that after controlling for my macro-level indicators differences between the Eastern European and other country group are also largely explained. Parents in the Southern European country group are far more likely to be married than in the other regions, even after considering parents' socioeconomic characteristics, differences in institutional arrangements, the labor market and attitudes. When seperately examining the effect of macro-level variables, I find that the inclusion of the unemployment variable actually emphasizes the differences between countries. The inclusion of the gender role attitudes index, however, can explain most differences between country groups. Specifically, it appaears that gender role attitudes can largely explain differences between the Nordic countries and the remainder of Europe.

Moving on to the results regarding my hypotheses, I find somewhat ambivalent evidence regarding the uncertainty hypothesis. This hypothesis assumes that economic insecurity should lead parents to avoid marriage. The hypothesis is tested by examining the effect of country level unemployment rates on the likelihood of parents of young children to live in a cohabiting or a marital union. Initially I had planned to also test the uncertainty hypothesis at the micro-level by considering the effect of unemployment, specifically of fathers. This was not possible as there are next to no fathers in my sample who are unemployed. However, I did include in the analysis a work intensity indicator for both fathers and mothers. The strong positive effect observed for fathers' work intensity, can be interpreted in light of the uncertainty hypothesis. While I find an effect for fathers' labor market integration, no significant effect can be observed for the unemployment rate at the country level. In fact, post-estimation analysis suggests that the effect of the unemployment rate on the likelihood of having a child in a marital versus cohabiting union might actually be positive.

This finding is at odds with the results from Section 4.1, where changes in the unemployment rate are positively associated with changes in the non-marital fertility ratio. A number of possible explanations for these discrepant findings were explored. The most likely explanation is that the TSCS analysis estimates the effect of lagged changes over time, while the multilevel models examine a level effect. Furthermore, reexamination of the TSCS data indicates that the different time periods of the two analyses might also be responsible.

As the gender equality hypothesis predicts, this analysis finds a significant negative effect for the gender role attitudes index on the likelihood of living in a marital versus cohabiting union. This is in line with the findings from Chapter 4.1, where a strong effect of gender role attitudes on the non-marital fertility ratio can be observed. However, post estimation analysis revealed that the effect of the gender role attitudes variable is not overly robust to model respecification due to its high level of correlation with the acceptance indicator. Of the employed country level indicators, the gender role attitude index is

also best suited to explaining variation between countries, and the inclusion of gender role attitudes leads to a reduction in the ICC of over 40%. The comparison of country groups further emphasized the importance of gender role attitudes. The gender role attitudes index is able to largely explain differences in parents' decision to be married or cohabiting between country groups. Specifically, gender role attitudes can explain much of the differences between the Nordic countries and other parts of Europe.

Three micro-level variables are employed to test the assumption that higher levels of social status are associated with higher likelihood of being married. While all three variables: education, home ownership and income are positively associated with marriage in the descriptive analysis, the multivariate analysis only finds a significant effects for education (more pronounced for fathers than for mothers) and home ownership. While an effect for income can be observed, it disappears after considering the effect of education in multivariate models. When examining the effect of educational combinations I find that couples with at least one highly educated partner are married significantly more often than those without, a result that I interpret as strong evidence for a status attainment effect.

The status attainment hypothesis also assumes that social status should be more important for determining parents' marital status where the acceptance of alternative family forms is greater. In order to test this assumption, I examine interactions between the three micro-level indicators detailed above and a country level attitudinal measure which assess acceptance of nontraditional family forms. Results indicate that in contexts where there is more universal agreement with the statement "It's okay to live together without being married," the proportion of parents who choose to marry is lower. This effect seems to be fairly universal for all social strata, and hence no significant interactions for any of the micro-level predictors can be observed. When examining the effect of status indicators by country group, I observe some slightly contradictory results. Acceptance of cohabitation is highest in the Nordic and Core European country groups and lower in Southern and Eastern Europe. For the Nordic and Core Europe country groups status effects can be observed mainly for fathers' education. In the Southern European countries no strong status effects can be observed. In Eastern Europe on the other hand, the effect of social status on the likelihood of being married is very pronounced. Thus, it appears that Cherlin's (2004) assumption that as the normative imperative to marry decreases, marriage becomes more of a status symbol, cannot be confirmed here. While admittedly Cherlin's hypothesis is one of cultural changes over time, it does not pass the test of a cross cultural comparison in the European context. The fact that the employed macro-level indicator assess acceptance towards non-marital cohabitation, and not childbearing outside marriage, can be seen critically. Thus I also tested whether employing acceptance of childbearing outside of marriage. This indicator was presented in Section 3.2 but is only available for a subsample of countries. However, I observe no changes in results when using this indicator.

The independence hypothesis proposes that labor market specific capital of mothers decreases the likelihood of living in a marital union. At the micro-level three indicators are employed to test this hypothesis: education, work intensity (which is measured for the previous year) and earnings (only as relative contribution to couples earnings). In regards to work intensity, I observe the predicted negative effect on the likelihood of being married. The fact that the effect of fathers' work intensity is positive further underlines this result. When examining the effect of the relative work intensity of parents I also find evidence

for an independence effect of mothers' labor market involvement. The same is true for the examination of relative income.

The evidence regarding the effect of mothers' education is not so clear cut, particularly as I assume that mothers' education entails a twofold effect. On the one hand, I expect a positive status attainment effect, similar to that observed by Perelli-Harris et al. (2010), and on the other hand, I expect a negative independence effect. The multivariate analysis finds a significant positive effect for the high education category, but no significant effect for medium levels of mothers' education. This finding contradicts the independence hypothesis and supports the status attainment assumption. However, when comparing the effect of mothers' education to that of fathers' education I observe far larger effects for fathers' education. I argue that these differences can be attributed to an independence effect of mothers' education.

I attempt to verify this assumption by examining whether the effect of mothers' education is context dependent. Specifically, I assume that the degree of compatibility of work and family life, measured via availability of childcare, can explain why the effect of mothers' education is contextual. The regression models by country group support the idea, as pronounced positive effects for mothers with tertiary education can be observed in the Southern and Eastern European country groups. In these regions compatibility is comparably low. In the Core and Nordic groups higher levels of education for mothers' are not associated with higher likelihood of being married when a first child is born.

To further explore this association cross-level interactions are estimated. This approach presents a far more sophisticated test of the hypothesis, and the results confirmed that the effect of education on the likelihood of marriage decreases where mothers can better combine work and family. However, the statistical power of the multilevel model to validate the observed differences between educational groups is limited. Results indicate significant differences in likelihood of being married between mothers with low and high levels of education in contexts with low to moderate levels of child care availability. No differences in likelihood of being married can be observed between educational categories in contexts with high child care availability. While data indicate that a similar pattern can be observed for low and medium levels of education, these differences are not statistically significant.

5 Conclusion

This study examines non-marital fertility in Europe, and investigates developments over time as well as differences between countries today. The focus is placed on the comparison of cohabiting and married parents. It is assumed that marriage is more often associated with a traditional gendered division of labor, whereas cohabiting unions are characterized by more egalitarian arrangements (Brines and Joyner 1999). At the same time, a contrasting perspective postulates that childbearing in cohabitation tends to be a consequence of economic disadvantage (Perelli-Harris et al. 2010). This study attempts to combine these perspectives by arguing that the mechanism by which parents' individual socioeconomic resources affect decision making can differ between countries. Additionally, this study examines how economic uncertainty, gender roles, and normative support for the institution of marriage affect young parents' decision to have a child within or outside marriage.

The study is devised as a large scale, cross-national comparison and combines two analytical approaches. By considering different perspectives on non-marital fertility the study seeks to highlight different aspects of the phenomenon under study. The first analysis is based on country level data, and takes on a long-term perspective. It examines changes in rates of non-marital fertility from the 1980s onwards within a time-series cross-section regression framework. The second analysis utilizes both individual and country level data in multilevel models. To a large extent, this analysis is limited to the comparison of cohabiting and married couples. The marital status at the time of birth of the first child serves as the dependent variable. I will summarize here the key findings from these analyses in regards to the five hypotheses postulated in Chapter 2. After this overview, I will move on to a critical discussion of the key objectives outlined in the introduction and the limitations of this study. Finally, I will discuss possibilities for future research, venture some predictions, and consider policy implications.

The normative backing of marriage hypothesis assumes that parents' decision to have a child outside of marriage can come with considerable social costs. These costs are assumed to be higher in contexts in which the normative and institutional support of marriage is stronger. This hypothesis is tested by examining whether religious participation and approval of marriage, both measured at the country level, impact rates of non-marital fertility. However, both the descriptive evidence presented in Chapter 3.1 and the multivariate results from the time-series cross-section regression refute this assumption. The country level association between approval of the statement "marriage is an outdated institution" and the non-marital fertility ratio is only very loose, and thus no significant effect can be observed in the multivariate time-series cross-section regression. It appears that in the Nordic countries, fairly few people are of the opinion that the institution of marriage is outdated, yet rates of childbearing outside marriage are very high in this region. Thus, the assumption that approval of marriage must be associated with disapproval of alternatives appears to be an oversimplification. This finding is in line with recent qualitative research from Norway (Lappegård and Noak 2015). At the country level, a strong negative association between religious attendance and the non-marital fertility ratio can be observed. Likewise, I find a significant negative effect of church attendance on non-marital fertility in the time-series cross-section models. However, once models control for female labor force participation the effect of church attendance disappears. This finding can be interpreted

in light of secularization theories, which see secularization as an aspect of modernization (Bruce 2000, Norris and Inglehart 2011). I argue that secularization and women's integration into the labor market often concur temporally. And that these developments might be part of one large scale modernization process. However, it appears that women's economic integration is of far greater relevance to explaining changes in non-marital fertility. At first glance, this finding contradicts the various studies which report a positive macro-level association of religiosity and non-marital fertility (Höpflinger 1985; Sobotka and Adigüzel 2002; Lappegård, Klüsener and Vignoli 2014; Vitali, Aasve and Lappegård 2015). However, in these analyses women's labor force participation is not considered as a covariate.

The uncertainty hypothesis postulates that individual and country level economic insecurity increases the likelihood of childbearing outside of marriage. This hypothesis is operationalized via country level unemployment rates as well as fathers' work intensity at the micro-level. I find that fathers' work intensity increases the likelihood of being married at time of childbirth. This association stands in contrast to the negative association observed for work intensity of mothers. In regards to the effect of the unemployment rate at the country level, the time-series cross-section and the multilevel regression models come to different conclusions. The results of the TSCS models confirm to theoretical predictions and find that increases in the unemployment rate lead to increases in the non-marital fertility ratio. The multilevel regression models, on the other hand, report a positive, but insignificant, effect of unemployment on the likelihood of living in a marital versus cohabiting union. Additionally, the comparison of single and married mothers in Section 4.2.7 also finds a significant positive association between the unemployment rate and likelihood of being married at time of childbirth. These contradictory results from the different analyses are in line with the incoherent findings reported in the literature. In order to better understand these discrepant results, a number of potential explanations were explored. The factors explored included: the different time frames of the two analyses, the different covariates specified in each model, the fact that the unemployment rate in the multilevel model is measured as the mean of the previous four years, and the dynamic specification in the TSCS model. The most likely explanation appears to be that while in the TSCS regression models the effect of lagged changes over time is estimated, the multilevel models consider only the effect of the level of unemployment. Furthermore, analysis of the TSCS data by decades indicates that the association between non-marital fertility and unemployment might have changed over time. The main conclusion in regards to this hypothesis is that parents' individual economic positon particularly that of fathers, is more important to explaining childbearing outside marriage than an abstract feeling of economic insecurity. Thus, these findings are more in line with Wilson's (1987) arguments on male marriageability than the assumptions of Mills and Blossfeld (2005).

The gender equality hypothesis posits that if perceptions of gender roles in societies are more egalitarian, childbearing outside of marriage should be more common. In order to test this assumption, a country level attitudinal indicator was created which assesses the extent of societal approval of women's role in the labor force. This gender roles attitudes index is employed in both the TSCS and multilevel regression models. Both models find that more egalitarian perceptions of gender roles are associated with childbearing outside marriage. These findings are in line with results reported by Lappegård, Klüsener and Vitali (2014), who included agreement with the statement "When jobs are scarce men should

be given preferred access" as a macro variable in their multilevel model. The findings from the TSCS models are particularly interesting, as this model considers the gender role attitudes index alongside female labor force participation. Not only do I find an effect of gender role attitudes after controlling for women's employment, but these effects actually reinforce each other. It is argued that the combination of gender role attitudes and female labor force participation can better assess women's position in society than either indicator on its own. The analysis reveals that in the countries of Eastern Europe, attitudes towards gender roles are far more conservative than in other parts of Europe, even though women are economically active and have been so for many years. Specifically, I conclude that women's economic integration does not automatically lead to more independence, particularly when women's employment is marginalized, limited to part-time employment, or a function of economic necessity.

The economic independence hypothesis assumes that mothers' labor market involvement should increase financial independence from their spouse and thus make marriage, which functions as an insurance mechanism, less desirable. In the time-series cross-section analysis, this hypothesis is tested via the female labor force participation rate, which proved to be an important predictor, and as expected is positively associated with increases in non-marital fertility. At the individual level, measuring the labor market position of mothers with young children is no trivial matter, as mothers of young children tend to take a hiatus from paid work. One of the strengths of the EU-SILC is that it assesses work intensity and earnings for the year previous to the survey. This information helps to better understand how closely mothers are attached to the labor market, even when they are currently on parental leave. I find that higher levels of work intensity are negatively associated with the likelihood of being married at the time of the birth of a child. Especially when considering that fathers' work intensity increases the likelihood of being married, this finding clearly supports the economic independence hypothesis. When assessing the relative work intensity of spouses, I also observed that higher proportions of labor force involvement of mothers reduce the likelihood of being married. Results regarding the relative earnings of partners confirm the findings regarding work intensity, and show that for couples in which mothers are the primary earners, marriage is far less common. The third indicator, and the one which receives the most attention in this analysis, is educational attainment. While the findings regarding work intensity and income clearly support the economic independence hypothesis, evidence regarding education is less clear cut, particularly as the predictions of the independence and status attainment hypothesis stand in stark contrast to each other. While no differences in the likelihood of being married at the time of birth can be observed for mothers with low and medium levels of education, mothers with tertiary education are actually more likely to be married. However, the effect of mothers' education is far smaller than that of fathers' education.

Additionally, this study tests the assumption that the effect of mothers' education should be dependent on context, and that an independence effect should be more pronounced where mothers can better combine work and family life. The micro-level regression results by country group find that in Eastern Europe, which today is characterized by extremely low rates of child care availability, the effect of mothers' education on the likelihood of being married when a first child is born is most pronounced. Similarly, for the Southern European country group, in which child care availability is higher than in Eastern Europe

but lower than in other regions, a positive effect on the likelihood of being married can be observed for mothers with tertiary education. In the Nordic and Core Europe regions, the only association between education and the likelihood of being married when a child is born is a small negative effect for mothers with medium levels of education. The association between child care availability and mothers' education is further explored in multilevel models via a cross level interaction. Here I find that in contexts with high availability of child care, there exist no significant differences in likelihood of being married at the time of birth, while there are considerable (but only partially significant) differences between education groups when compatibility is low. These results are in line with theoretical predictions, but the confidence of the multilevel model in confirming these assumptions is limited. While differences between mothers with low and high levels of education are significant, differences between low and medium, and medium and high levels of education are not. The assumption that mothers' education entails both a status and an independence effect provides a sound theoretical explanation for the different effects observed throughout Europe. In addition, empirical results generally support the assumption that in some contexts the independence effect negates the status effect.

The status attainment hypothesis is derived from the idea that marriage itself is a status symbol (Cherlin 2004) with certain economic prerequisites. Thus it is assumed that couples with higher social status should be more likely to be married at the time of the birth of a child. This hypothesis is only examined in the multilevel models and three different indicators are considered: educational attainment (of both fathers and mothers); home ownership; and the households' income (equivalized and expressed as the relative position within a country's income distribution). While the predicted positive effect on the likelihood of being married can be observed for all three variables, the effect of household income in particular is only very small, and not significant when also considering the effect of education. In regards to education, a far more pronounced effect for fathers' than for mothers' education on the likelihood of being married can be observed. I interpret this finding as support for the assumption that mothers' education entails both a status and an independence effect. The examination of educational combinations of parents provides further support for the assumption that social status increases the likelihood of being married. Specifically, it emphasizes the importance of tertiary education, as all educational combinations with at least one highly educated partner, are more likely to be married when their first child is born than couples in which neither partner has a tertiary degree. This finding is similar to results reported by Trimarchi and VanBavel (2015).

Based on Cherlin's (2004) argument that social status has become more important for marriage as it becomes less universal, I attempted to test whether the effect of social status is more pronounced in contexts which are more tolerant towards alternative family forms. I find no significant interactions between various measures of social status and a country level variable measuring agreement with the statement "it's okay to live together without being married." Examination of results by country group reveal that social status is most important for predicting marriage status at the time of birth in the countries of Eastern Europe. However, Eastern European countries are also characterized by the lowest levels of acceptance of cohabitation. Thus, the assumption that social status is more important where alternatives to marriage are more accepted cannot be confirmed in the European context. The fact that such a pattern cannot be observed, might also be attributed to

the strong association between acceptance of cohabitation and child care availability in Europe. Thus, the contextual assumption of the status attainment hypothesis might also be at odds with the contextual assumption of the independence hypothesis.

In the introduction I formulated three key objectives which I want to critically reflect upon here.

1. Provide a comprehensive overview of the development of non-marital fertility in Europe on the basis of comparative individual and country level data.
2. Examine the role of mothers' and fathers' resources in decision making.
3. Examine whether the effect of parents' socioeconomic resources varies between national contexts.

This study has attempted to examine both the long-term development of non-marital fertility in Europe and differences between countries. Sections 3.1 and 4.1 take a long-term perspective on the basis of country level data, while Section 4.2 incorporates both micro- and macro-level data and presents the geographically most extensive analysis on the topic of non-marital fertility to date. A number of recent articles have highlighted developments in rates of non-marital fertility in Europe over the last decades (Klüsener, Perelli-Harris and Sanchez Gassen 2013; Klüsener 2015), thus while there is not much truly novel about the descriptive statistics presented in Section 3.1, they provide a valuable frame of reference. Additionally, the chapter attempts to discern whether there are common patterns across countries in the development of non-marital fertility in Europe since 1960. The analysis finds that while rates of non-marital fertility are still increasing, both absolute and relative increases have slowed over the last decades. Particularly in the Nordic countries, growth rates have been very slow, and rates of childbearing outside of marriage have remained fairly stable over the last 10 to 20 years. While similar patterns can be observed in a number of other countries, the overall trend across Europe is still one of moderate increase. My analysis suggests that changes in non-marital fertility ratios throughout Europe do not follow one common pattern, but instead are somewhat path dependent.

A further important objective of this research is to consider how mothers' and fathers' socioeconomic resources impact decision making. This objective is indebted to the idea that marital decision making can be understood as a bargaining process between partners (Cherlin 2004). I find that father characteristics are very important in predicting the marital status of a couple at the time of birth, probably more important than those of mothers. While mothers' position in the labor market is detrimental to being married when having a first child, the reverse is true for fathers. Furthermore, while the effect of mothers' education appears to be strongly dependent on context, the effect of fathers' education is far more stable across different contexts. This research also finds that the sole focus on mothers' in recent studies (e.g. Perelli-Harris et al. 2010) has likely led to an overestimation of the effect of mothers' education. The models presented here show that the effect of mothers' education on the likelihood of marriage is smaller than that of fathers, and that a considerable portion of the effect of mothers' education can be attributed to the more favorable partnering of women with higher levels of education. When formulating my hypotheses, I emphasized the importance of the relative position of parents to each other. This perspective, motivated by Becker's specialization model (1991), is also an important aspect

of the multivariate analysis. However, when examining the relative position of fathers and mothers, the evidence regarding the importance of relative resources of partners is not as strong as expected. This becomes most apparent when examining the educational combinations of parents. Theory predicts that couples with unequal education are more likely to be married at childbirth. While this is the case for the combination of highly educated fathers and mothers with low levels of education, the overall pattern does not necessarily conform to theoretical expectations. Instead I find that if at least one parent has a high level of education, the couple is more likely to be married than couples in which neither partner is highly educated. Similarly, when examining the relative work intensity or relative earnings of couples, an effect for the unequal division of labor between partners can be observed. However, these effects pale in comparison to those observed when explicitly examining mothers' relative contribution. Thus, while fathers are important for explaining young parents' marital status, this seems to be due to the fact that the effect of fathers' and mothers' socioeconomic resources are gender specific, and not so much due to the relative socio-economic resources of partners as the specialization model would assume.

The final and most important objective formulated in the introduction is based on the idea that decision making, and thus the effect of parents' socio-economic resources, is dependent on context. This idea is guided by the assumption that the decision making of couples must take into account social and economic boundary conditions. Specifically, it is assumed that the compatibility of work and family life should impact the degree to which mothers can participate in the labor market, and thus mediate dependence on their spouse. It is argued that where alternatives to marriage are more accepted social status should be more important for parents' decision to be married at the time of childbirth. While the predicted contextual effect of social status cannot be observed, I find considerable evidence for the assumption that the effect of mothers' education is mediated by the degree of compatibility of work and family life. Additionally, the models by country group clearly demonstrate that there is considerable variation in the individual predictors of marital status at time of childbirth between regions.

However, this study also has a number of limitations which must be discussed. Like any large scale cross-national comparison, the conclusions drawn from both the TSCS and multilevel models are prone to generalization errors which result from averaging of effects. In the multilevel models I attempted to minimize this problem by explicitly modelling the contextual nature of effects. This was not possible in the time-series cross-section analysis. By design, such an analysis will make generalizations, and in fact it was an active choice on my part to attempt to highlight macro-level patterns, in order to contrast the multitude of single country studies currently available. Similarly, my decision to use a large scale country comparison to examine the contextual nature of individual predictors could be criticized by arguing that examination of contextual effects might be more easily achieved with a comparison of a few typical cases, allowing for a more nuanced and detailed operationalization of boundary conditions. However, the approach chosen here to examine the contextual nature of effects via cross-level interaction terms is a far more rigorous test of hypothesis, which is less prone to cherry picking of cases.

A further criticism which can be raised towards my research design, specifically in regards to my selection of countries, is that the sample of countries is not drawn at random. While I sought to achieve the largest possible coverage of European countries, the

selection of cases is ultimately guided by data availability. Considering that of the 30 states of the European Economic Area, this analysis omits Malta, Lithuania, Germany and Switzerland, it is hard to argue that this presents a purposeful subsample. A potential criticism which is far harder to refute, is criticism of the classification of country groups employed in this analysis. Ultimately, this selection of countries is somewhat ad-hoc, and largely guided by geographical or cultural proximity. While the country groups chosen here did a good job of highlighting the contextual nature of parents' decision making, the Southern and Eastern European country groups are a bit problematic, due to the considerable diversity in patterns of non-marital fertility within these regions. Future research which seeks to classify countries in Europe in regards to non-marital fertility would benefit from a more refined approach. Whether it is advisable to employ existing classifications such as the welfare state typology (Esping-Andersen 1990; Esping-Andersen 1999) or adaptions thereof is likely strongly dependent on the specific research question, however.

The choice to employ cross-sectional data as my micro-level data source will likely be seen critically by some, particularly as it has become standard to employ longitudinal event history data when analyzing childbearing outside of marriage. There are two issues attached to employing cross-sectional data for this analysis. For one, the research design employed in Section 4.2 does not allow me to study transitions into parenthood but only to compare the marital status of those who recently had a child; as a result, selection into parenthood is not controlled for. The other issue is that of causality in regards to marriage decisions. As the data employed provide no information on the date of marriage, explaining marriage decisions via characteristics observed at a different time can be seen as an imprecision. Ultimately, this is an imprecision I was willing to accept, as the focus of this study is placed on the cross-national comparison, and no available longitudinal data source would have allowed me to consider a similar amount of countries.

A further limitation which is also associated with the use of cross-sectional data is the imprecision in regards to the operationalization of first births, based solely on the household context. For one, older mothers' children may have already moved out of the household. Secondly, the chosen research design entails imprecision in regards to patchwork families. Cases in which a child is born in a household which is actually the mother's first born alongside a half-sibling are categorically excluded from the analysis. A further imprecision which must be acknowledged are cases in which a parent has children in a previous family which ends in separation and then later starts a new family. This scenario tends to be more likely for fathers and might have an effect on marriage status at the time of birth due to previous experience, or an existing marriage that has not yet been divorced. However, on the basis of the existing research design, such factors cannot be controlled for.

The focus of this study is placed primarily on socioeconomic and attitudinal factors. While legal factors are discussed in Section 3.3, they are not considered in the actual multivariate analysis. However, there are a number of ways in which laws and taxation schemes might affect parents' decision whether or not to be married at the time of childbirth. This includes issues such as the legal treatment of cohabiting partners, the rights of unmarried fathers, the taxation of married couples, and the taxation of single versus dual earner couples. The fact that the multivariate analysis presented here disregards legal factors is partly due to methodological issues, but the most important reason is that in order

to thoroughly operationalize legal aspects, more time and expertise in legal matters would have been necessary, particularly when employing a longitudinal perspective.

Recent papers by Perelli-Harris and Sanchez Gassen (Perelli-Harris and Sanchez Gassen 2012; Sanchez Gassen and Perelli-Harris 2015) investigate the legal aspects of cohabitation, and childbearing in cohabitation. Indeed, legal boundary conditions present an interesting avenue for future research. Studying changes in legislation over time in particular could provide insight on the interrelation of policy and behavioral change. Specifically, such an inquiry could attempt to solve the question of whether policy changes can be understood as a consequence of behavioral and attitudinal changes or vice versa.

While this study provides evidence that the decision whether or not to be married at the time of childbirth is very much dependent on context, the results presented here are not fully conclusive. Future studies which seek to explore the contextual effect of parent's socioeconomic resources will need to take considerable care in selecting data sources for such an inquiry, especially if they plan to employ multilevel models. One possibility which would allow for the inclusion of more countries in the analysis, by expanding the scope beyond Europe, would be to analyze census microdata from the Integrated Public Use Microdata Series. However, such an inquiry would likely require that a researcher accept additional imprecisions in regards to the operationalization of family status at the time of birth, and would further restrict the available sociodemographic information for parents. Another data source, which might prove interesting for such an inquiry in the near future, is the Gender and Generation Survey. It will add more detailed retrospective information with the second wave, in particular regarding employment. However, such an approach would also imply an even smaller sample of countries to work with than employed here.

This study has only considered single motherhood in passing, partly due to my desire to consider the characteristics of fathers, and partly due to the widely shared belief (Kiernan 2004; Perelli-Harris et. al. 2010) that childbearing in Europe is mainly confined to cohabiting unions. However, the analysis on single motherhood in Section 4.2.7 indicates that in the former socialist countries of Eastern Europe, births to single mothers might actually be just as common as births in cohabiting unions. Considering that the antecedents of childbearing to single mothers seem to differ from those of childbearing in cohabitation, this phenomenon merits additional research. A theme emphasized here, attitudes toward gender roles, might play an important role, as some qualitative studies indicate that Eastern European men's traditional views on the family might play a role in a mother's choice to forego partnership (e.g. Eglitis 2010).

What can be learned from this study, and what do the results suggest for the future of non-marital fertility in Europe? I would first like to address implications which concern the academic inquiry on the topic of non-marital fertility, before evaluating the possibility of making future predictions on the basis of the results presented here and their implications for policy making.

Of the explanations examined in this thesis some have proved valid, while others fall short, while yet others provide rather ambiguous results. Whether or not perceptions of insecurity, which arise from economic uncertainty, provide an explanation cannot be confirmed or rejected on the basis of this study. Instead, this study provides strong evidence that parents are more likely to forego marriage as a place for childbearing in societies with higher levels of equality between the sexes, both in regards to perceptions of gender

roles and economic position. Of the explanations explored, the one which appears to have the least merit is the idea that non-marital fertility can be seen mainly as a consequence of changing value orientations concerning marriage. This to me implies that the second demographic transition, which conceptualizes childbearing outside of marriage as a rebellion against traditional values, and still presents a popular frame of reference when studying non-marital fertility today, should be dismissed in favor of more sophisticated theories which conceptualize non-marital fertility as the outcome of parents' decision making. While this study cannot claim to having fully developed such a framework, it provides some indication as to which factors merit future consideration.

When comparing how the individual characteristics of parents vary between different family forms at the time of birth, three central observations must be emphasized. For one, this study confirms that childbearing outside of marriage is more common among the more disadvantaged, both when comparing single mothers (McLanahan 2004) and cohabiters (Perelli-Harris et al. 2010) to married couples. Differences between cohabiters and married couples seem to be considerably smaller than those between single and married mothers. In regards to the distinction between marriage and cohabitation at the time of the birth of a first child, I find considerable evidence that fathers' and mothers' socioeconomic resources have different effects. While fathers' socioeconomic characteristics are positively associated with marriage, this association is less pronounced for mothers. The third central finding is that the effect of mothers' socioeconomic characteristics (specifically education) is highly dependent on the national context.

Based on the analysis of trends in section 3.1, a few general predictions about the short- to mid-term development in levels of non-marital fertility in Europe can be attempted. For one, I expect that diversity in rates of non-marital fertility throughout Europe will likely decrease over the next decades. This prediction is based on the finding that rates of absolute increase in non-marital fertility are strongly interrelated with current levels of non-marital fertility. In countries in which rates of non-marital fertility have reached relatively high levels, the absolute increase will likely slow or possibly come to a halt. Such a trend can be observed in the Nordic countries over the last decades, and more recently in a number of other countries. Countries with comparatively low levels of non-marital fertility will likely witness larger absolute increases and catch up to a certain extent. Specifically, two countries in Southern Europe (Cyprus and Greece), for which the rates of non-marital fertility have started to increase rapidly of late, will likely witness a fairly swift growth in levels of non-marital fertility. This assumption is based on the observation that once rates of non-marital fertility have reached a certain threshold, usually around 10 percentage points, they tend to grow far more swiftly afterwards. While this process seems to have already begun in Cyprus, it remains to be seen whether the recent increases in Greece are only a short term reaction to the recent crisis or the start of a long-term growth period.

More long-term projections are somewhat difficult. The results of this thesis indicate that the large scale societal process which plays the most important role in the expansion of non-marital fertility in Europe is the emancipation of women and the move away from single to dual earner families. While I find no clear indication that declines in rates of non-marital fertility might be observable any time soon, it is not unimaginable. If the current development towards dual earner arrangements is reversed, due to large scale changes in the labor market or because governments begin to enact policy which provides substantial

financial benefits to single earner couples, this would likely result in a reversal of current trends. Similarly, should the effect of mothers' socioeconomic resources change and become more similar to that of fathers, and female breadwinner households become more common, this might also lead to a reversal of trends.

However, as things stand currently, the trend towards de-familalization of care responsibilities which is being pursued by European governments in light of Barcelona targets (European Commission 2013), and the fact that women's economic independence is a considerable deterrent to choosing marriage as a place for childbearing, suggests that levels of childbearing outside marriage will likely remain persistently high in the near future. What will be interesting to observe in the future is whether the economic disparities between parents who have a child in cohabitation or marriage will become smaller or larger. Cherlin's (2004) argument about marriage as a status symbol would predict that they increase, whereas my finding that higher levels of compatibility are associated with a more pronounced independence effect of women's education would point to a different development: that mothers with higher levels of education are more likely to choose cohabitation as a place for childbearing if the compatibility of work and family increases. Thus, assuming that European governments make progress towards Barcelona targets, one would expect that the social inequality between children born in marriage and cohabitation might actually decrease.

The arguments advocated here support the view that increases in childbearing outside of marriage might very well be an unintended consequence of the changes taking place in society, and which are currently being reinforced by public policy. If public policy seeks to increase women's, and specifically mothers' labor force participation, it has to be acknowledged that this will also lead to changes in how family life is organized. Policy makers will have to consider whether under such circumstances upholding of laws and regulations which offer preferred treatment to married couples is desirable, especially when considering that those children born outside of marriage today are likely at a disadvantage due to the lower social status of their parents.

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Appendix A: Technical Notes on Country level Data

Data for the TSCS analysis come from a wide range of sources such as Eurostat, the OECD, ILO, national statistical institutes. Some are extracted from social surveys such as the ISSP. All variables are calculated at the country level for individual years. Holes in time-series are imputed via geometric mean substitution. Table A1 includes the values for all variables at three selected time points (1986, 1996 and 2006). The following variables are employed in the analysis:

Non-Marital Fertility Ratio: The non-marital fertility ratio serves as the dependent variable of this analysis and is measured as the percentage of live births to unmarried mothers. These data are taken from Eurostat's dissemination database which includes data from 1960 onward.

Female Labor Force Participation Rate: Measured as percentage of working age population (15-74) in the labor force (either working or looking for work). Data are taken from ILO's KILM database and from Statistics Norway.

Unemployment Rate: Measured as the proportion of the labor force that does not have a job and is actively looking and available for work. These data are taken from ILO's KILM database.

GDP per Capita: Measured in 1990 U.S. Dollars and converted at "Geary-Khamis" purchasing power parities. Taken from the Conference Board Total Economy Database.

Marriage Outdated: This indicator reports the percentage of the population which agrees with the statement "marriage is an outdated institution." The initial variable is coded 1 "agree" 2 "disagree." The indicator is calculated on the basis of data from the European Values Study and aggregated to the country level. All calculations use weighted data.

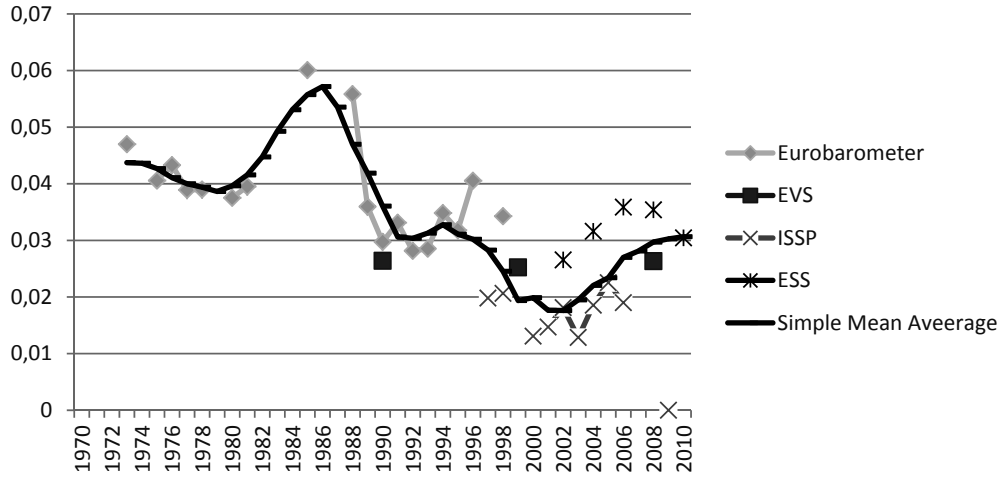
Gender Role Attitudes Index: The gender role attitudes index is comprised of the following three items taken from the European Value Study wave:

> *"When jobs are scarce, men have more right to a job than women"*
>
> *"A working mother can establish just as warm and secure a relationship with her children as a mother who does not work"*
>
> *"Being a housewife is just as fulfilling as working for pay"*

Items are aligned, and aggregated into a 100 point scale with equal weighting of all items. A score of 100 represents full approval of egalitarian gender roles whereas a score of 0 corresponds to traditional perceptions on gender roles in all areas. All calculations use weighted data.

Church Attendance: Church attendance is measured as the percentage of population attending religious services at least once a week. Data are taken from a number of social sur-

veys: the Eurobarometer, the International Social Survey Programme (ISSP), the European Values Study (EVS) and the European Social Survey (ESS). Information from these various surveys is pooled in order to generate a single time-series on church attendance which spans from 1970 to 2010. As these surveys use a wide range of different survey tools, sampling designs and are of varying quality (McAndrew and Voas 2011), a rigorous method is applied in order to generate a single long-term time-series from these varied sources. The answer categories for this item diverge widely between the different study programs and over time. The least common denominator of all surveys is that they identify whether a person attends church at least once a week, usually through one category, often through two categories and very rarely through three categories.



Graph A.1 Church attendance time-series for Denmark

In a first step these categories are collapsed and the percentage of the population who attend religious services on a weekly basis is calculated for every available year and country of all 5 survey programs. Especially for the more recent years, multiple observations for a single country in a given year are recorded. Major outliers in these time-series (values that deviated more than 50% from average values over a 3 year time span) are removed, before generating the means of all values for a given year in a country. However, these time-series still contain considerable gaps which are imputed in a third step via geometric mean substitution. As these time-series contain some rather sharp trends which are more likely to be methodological artifacts than actual social developments, 5 year simple mean averages are calculated. At the edges of the time-series 3 and 4 year averages are calculated instead. Graph A1 below highlights the method for generating such a time-series using the example of Denmark which covers the full-time span from 1970 to 2010, uses data from all 5 different social surveys and shows some of the highest variation between years.

Table A.1 Correlations between indicators presented in Chapter 3.3

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Non-marital fertility ratio	(1)	1													
Marriage outdated	(2)	0.104	1												
Okay to live together without marriage	(3)	0.582	0.322	1											
Have children ... should get married	(4)	0.459	0.465	0.745	1										
Gender role attitudes	(5)	0.702	-0.036	0.761	0.570	1									
Female employment rate	(6)	0.670	-0.172	0.533	0.060	0.554	1								
% women working part-time	(7)	0.259	0.267	0.632	0.526	0.667	0.440	1							
Maternal employmynet rate (kid <=15)	(8)	0.394	0.071	0.449	0.288	0.475	0.743	0.305	1						
Maternal employmynet rate (kid <=3)	(9)	-0.082	0.246	0.411	0.426	0.173	0.375	0.507	0.723	1					
Child care participation	(10)	0.431	0.136	0.746	0.722	0.674	0.508	0.573	0.690	0.637	1				
% GDP spent on child care	(11)	0.614	-0.294	0.583	0.338	0.816	0.676	0.440	0.485	0.252	0.650	1			
Child care cost	(12)	0.082	0.084	0.139	0.307	0.007	0.123	0.323	0.145	0.337	0.146	0.028	1		
Taxation dual vs. single earner (133%)	(13)	-0.304	-0.036	0.200	0.344	0.052	-0.039	0.372	-0.015	0.161	0.103	0.045	0.170	1	
Taxation dual vs. single earner (200%)	(14)	-0.162	-0.181	0.290	0.410	0.291	0.033	0.414	0.005	0.145	0.296	0.274	0.137	0.893	1

Table A.2 Mean values of TSCS variables for selected years

	Non-marital fertility ratio			GDP per capita			Female labor force particiation			Unemployment rate			Church attendance			"Marriageout-dated"			Gender role attitudes index		
	86	96	06	86	96	06	86	96	06	86	96	06	86	96	06	86	96	06	86	96	06
Belgium	7.1	17.3	39.4	15	18.3	22.3	36.5	40.5	45.7	11.3	9.3	8.4	24.2	15.4	9.3	20.0	26.5	32.0		58.2	63.7
Bulgaria	11.7	25.7	49.0	6.2	5.3	7.7		63.1	57.3		15.7	10.1		4.3	5.4		14.5	23.0		51.6	62.5
Cyprus	0.4	1.4	4.4	7.4	8.6	10.2	32.3	47.6	53.3			5.3			11.7						
Czech Republic	7.3	15.6	31.7		8.5	11.0		52.3	50.6		4.0	7.9		5.3	6.2		9.0	17.5		52.4	59.9
Denmark	43.0	46.5	45.7	17.4	20.4	24.0	59.7	57.5	60.4	7.8	7.0	4.8	5.6	3.1	2.3	18.0	16.5	14.0		71.3	75.3
Estonia		44.2	58.5		8.4	18.4		58.8	53.1		9.7	7.9		3.6	3.2		13.5	18.0		58.7	62.3
Finland	16.4	33.1	40.4	14.5	16	22.5	65.0	60.9	64.2	5.1	15.3	8.4	4.6	5.2	4.1		15.5	16.5		68.3	68.0
France	19.6	37.6	47.4	15.5	18.3	21.5	46.5	48.2	50.7	10.3	11.8	8.9	12.0	8.0	5.6	30.0	32.5	35.5		59.9	66.9
Greece	1.8	3.0	5.1	9.3	10.3	14.6	34.7	35.5	42.2	7.8	9.1	9.8	25.6	24.3	21.3			18.5			62.0
Hungary	9.2	20.7	35	6.6	5.8	8.6	77.4	40.5	47.8		10.2	7.2		9.9	8.3		14.0	18.0		55.5	63.7
Iceland	48	60.9	65.7	16.3	17.4	24.6		76.1	77.8		4.9	2.6		2.8	3.9	9.5	7.0	9.5		68.5	71.0
Ireland	8.5	22.3	31.8	9.3	14.4	25.7	33.3	39.9	51.8	17.9	12.0	4.3	83.9	67.9	45.2	11.5	16.0	22.5		54.6	58.4
Italy	5.4	8.1	15.2	14.1	17.2	19.2	33.1	33.6	37.9	9.4	11.7	7.7	35.2	36.2	30.9	18.0	15.0	18.0		54.1	58.6
Latvia	14.4	29.9	44.6		5.7	12.0			50.9			8.9		4.7	2.8		12.5	18.0		56.9	65.3
Lithuania	7.0	12.8	28.4		5.1	9.5			51.2		17.1	8.3		16.0	12.3		14.5	19.0		45.5	56.9
Luxembourg	8.7	13.1	27.2	17.6	26.1	36.7	35.0	35.9	46.3	3.0	2.9	4.5	31.0	20.5	12.6			34.5			63.5
Netherlands	8.3	15.5	34.9	15.3	18.7	23.1	34.8	48.3	57.4	10.5	7.2	4.7	22.4	14.2	12.2	18.0	23.0	26.0		64.1	68.7
Norway	25.8	47.6	51.8	17.3	21.6	27.4	60.0	64.0	68.7	2.6	4.9	4.6		4.3	3.9	11.5	12.3	16.8		68.2	74.8
Poland	5.0	9.5	18.5	5.7	5.6	8.5		51.5	47.7		13.3	17.7		46.7	46.8		7.5	13.5		45.9	54.5
Portugal	12.3	18.7	30.8	8.3	11.6	14.2	39.9	42.8	55.6	8.6	7.2	7.6		31.8	26.3		24.5	28.5		60.4	61.0
Romania		19.8	28.5	4.2	3.2	4.1		60.4	46.9		8.0	7.2		22.7	25.8		10.5	16.0		59.4	61.6
Slovakia	6.6	12.6	26.0		7.0	10.3		51.5	51.3		13.1	16.2		31.1	30.8		9.5	13.0		54.0	60.9
Slovenia	19.1	29.8	46.7		10.8	15.9		52.1	52.9		7.2	6.5		14.1	16.2		22.5	26.0		61.0	65.8

	Non-marital fertility ratio			GDP per capita			Female labor force particiation			Unemployment rate			Church attendance			"Marriageout-dated"			Gender role attitudes index		
	86	96	06	86	96	06	86	96	06	86	96	06	86	96	06	86	96	06	86	96	06
Spain	8.0	11.1	26.6	9.7	13.1	17.2	28.7	37.7	46.4	21.0	22.7	9.2		23.1	16.9	19.0	16.0	25.0		59.3	64.2
Sweden	46.3	53.0	55.5	16.2	17.6	23.6	68.2	67.2	68.8	3.1	9.1	7.7		3.9	3.4	14.5	17.0	20.5		70.3	75.2
United Kingdom	18.9	33.5	42.9	14.2	17.6	22.7	49.6	53.1	55.9	11.3	8.6	4.7	13.1	11.8	11.4	16	22	24.5		58.1	62.1

Appendix B: Technical Notes on Variables for Multilevel Models

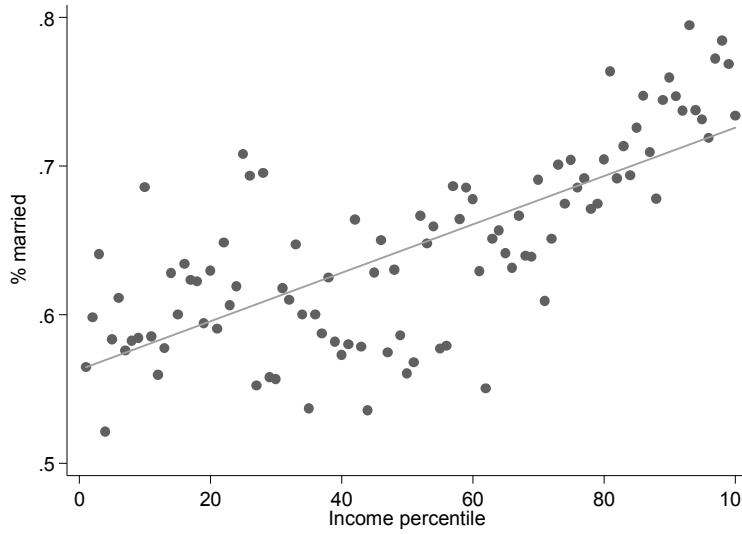
Family Type: The dependent variable of the analysis is coded 0 for cohabiting partners and 1 for married partners. Parents can be identified via a pointer variable which identifies the father and mother of a given child. The population for the analysis was selected by identifying those children who are 0 years of age and who do not have any siblings in the household. If both parents report their marital status (PB190) to be 'married' then the dependent variable is coded 1, for all other partner households it is coded 0.

Age of Mother: As the effect of mothers' age is not linear, mothers' age is logarithmized. Like all other linear variables it is centered on the mean.

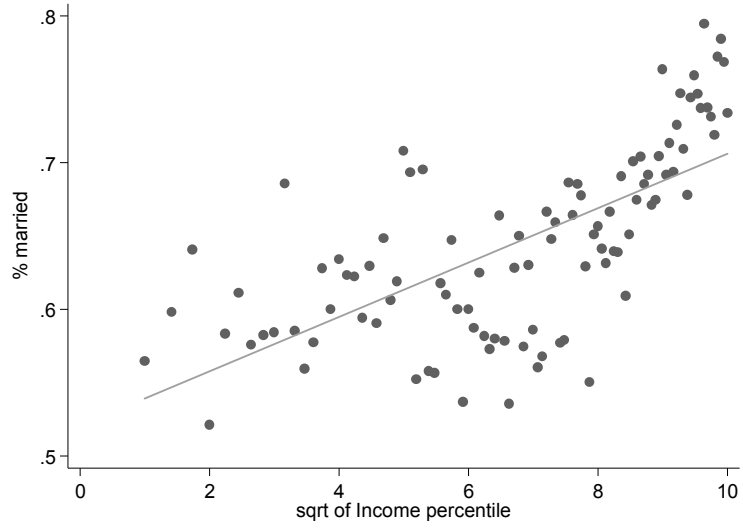
Age Difference between Partners: As mothers and fathers age is highly correlated age is modeled via age of mother and age difference. The effect of age differences is not linear, however, and different splines can be observed depending on which partner is older. Thus, I chose to model age differences categorically. The following categories are used to represent age differences:

1 Age difference at most 1 year (reference category)
2 Mother up to 3 years older
3 Father up to 3 years older
4 Mother up to 5 years older
5 Father up to 5 years older
6 Mother more than 5 years older
7 Father more than 5 years older

Household Income: In order to get a sense of households' relative economic position within a society country level percentiles of the equivalized disposable household income (HX090) are calculated. For the multivariate analysis this variable is centered on the mean. While the relationship between marital status and income is not perfectly linear, transforming the variable via square root does not yield a better fit, as can be seen from Graphs A.2 and A.3.



Graph A.2 Proportion married by income percentile



Graph A.3 Proportion married by square root of income percentile

Home Ownership: Information on home ownership in the EU-SILC is contained in three variables. The variable HX070 assesses whether the home is owned or rented, and variables HB080 and HB090 point to persons in the household who are responsible for the accommodation, i.e. either renting or owning it. The resulting variable 'ownhome' is coded 1 if HX070 indicates that the accommodation is owned by someone in the household and if either HB080 or HB090 point to the mother or father.

Educational Attainment: Information on the highest level of education attained is reported via the ISCED classification in the EU-SILC and uses 6 categories. Following the example of the Luxembourg Income Study[1] these 6 categories are recoded to three categories 'low' which includes primary, pre-primary and lower secondary education, and those who never attained any formal education[2]; 'medium' which includes upper secondary and post-secondary non tertiary education; and 'high' which includes tertiary education. This variable is computed for both fathers and mothers.

Work Intensity: In order to assess parents' involvement in the labor market I created an index which takes on scores between 0 and 1. This indicator is constructed on the basis of items which assess an individuals' labor market activity for each month of the previous year. For each month in which a person was not working a score of 0 is assigned, if a person was working part-time a value of .5 is assigned, when working full-time a score of 1 is assigned. The sum for all months is divided by 12. A score of 0 indicates that a person was economically inactive for the entire year while a score of 1 indicates that a person was employed full-time all year.

It has to be noted that this operationalization entails a certain degree of imprecision for mothers. In a considerable number of cases, the birth of a child occurred during the year prior to the survey, i.e. the year for which data on employment is collected. Ideally, one would attempt to assess mothers' employment only for those months of the previous year in which she did not yet have a child. However, information on the quarter of birth of a child is not available for all countries. And thus, such an operationalization would have led to exclusion of a number of countries (IE, NL, UK, SI), something that I wished to avoid at all cost. In order to verify the employed operationalization, two separate regression models are estimated which include only those countries for which the quarter of birth is available (see Table A.3). One model includes the specification which considers employment for the entire last year. The other model includes the work intensity variable which considers the month of birth of a child. The results displayed in Table A.3 indicate that the effect coefficient for the work intensity score which was adjusted for the time of birth is slightly lower. However the substantial model interpretation remains unchanged.

1 http://www.lisdatacenter.org/wp-content/uploads/standardisation-of-education-levels.pdf

2 These cases are treated as missing in the EU-SILC but identifiable via a flag variable.

Table A.3 Alternative measure of mothers work intensity

	Standard Model	Alternative Model
Equivalized income	-0.002	-0.002
	(0.001)	(0.001)
Home ownership	0.249**	0.247**
	(0.053)	(0.053)
Education (mother) Low	Ref.	Ref.
Medium	0.089	0.087
	(0.075)	(0.075)
High	0.406**	0.403**
	(0.086)	(0.086)
Education (father) Low	Ref.	Ref.
Medium	0.138*	0.139*
	(0.068)	(0.068)
High	0.473**	0.474**
	(0.081)	(0.081)
Work intensity (mother)	-0.194**	
	(0.068)	
Work intensity (father)	0.300**	0.301**
	(0.091)	(0.091)
Work intensity (mother) alt		-0.161*
		(0.067)
Constant	0.490	0.481
	(0.287)	(0.287)
Variance (Country)	1.579**	1.577**
	(0.456)	(0.456)
Deviance (-2 ll)	12059	12061

Logit coefficients, s.e. in parentheses; N=11498 ; * p < .05, ** p < .01;
year fixed effects, age and age diff. not shown

Proportion of Family Income Earned by Mother: This indicator is calculated by aggregating different income components for both fathers and mothers. It considers employee cash or near cash income (PY010), cash benefits or losses from self-employment (PY050), unemployment benefits (PY090), old-age benefits (PY100), survivor' benefits (PY110), sickness benefits (PY120), disability benefits (PY130) and education-related allowances (PY140). However, the collection of income data in the EU-SILC is not consistent. Some countries report only gross income, others report only net income and others report both. This inconsistency in data is the main reason for not employing absolute measures of income data. Instead only the relative contribution to a couples shared income is calculated. The proportion of family income earned by mother is calculated by dividing mothers' income by the sum of mothers' and fathers' income. In countries for which gross earnings are available these are used, otherwise net earnings are used. As income can take on negative values I recoded negative income to zero to allow for proper estimation of relative earnings.

Child Care Enrolment Rate: The child care enrolment rate is calculated as the percentage of children between ages 0 and 2 in formal child care arrangements. This includes group care in child care centers, registered child-minders based in their own homes looking after

one or more children and care provided by a professional child-minder at the home of the child. This variable is taken from the OECD social policy database and refers to the year 2010.

Acceptance of Non-Traditional Family Forms: The degree of approval with nontraditional family forms is assessed via the variable "okaycohab". This variable calculates the percentage of population who agrees or strongly agrees with the statement "It is okay to live together without being married." These two categories being the most positive on a 5 point Likert scale. The variable is generated on the basis of data from the EVS Wave 2008-2010 and takes on the same value for all years under study.

Unemployment Rate: Unemployment data are used to test the uncertainty hypothesis, the assumption being that the current economic climate effects the decision to commit to a long-term bond such as marriage. In order to better model this boundary condition and particularly young adults' actual experiences the mean of the unemployment rate over the current and the previous 4 years is calculated. Data on unemployment are taken from ILO's KILM database and are available for all years from 2004 through 2012.

Gender Role Attitudes Index: The gender role attitudes index is comprised of the following three items taken from the European Value Study 2008-2010 wave:

> *"When jobs are scarce, men have more right to a job than women"*
>
> *"A working mother can establish just as warm and secure a relationship with her children as a mother who does not work"*
>
> *"Being a housewife is just as fulfilling as working for pay"*

Items are aligned and aggregated into a 100 point scale with equal weighting of all items. A score of 100 corresponds to full approval of egalitarian gender roles whereas a score of 0 corresponds to traditional perceptions on gender roles in all areas.

Overview of Missing Values for Multilevel Models

Table A.4 provides an overview of missing values for each variable by country. It reports the percentage of missing values by variable for each country. Household income and age are excluded from the table as there are no missing values for these variables.[3] 2.6% of all cases are excluded from the analysis due to missing values. The proportion of missing values among cohabiters (3.5%) is slightly higher than among married couples (2.1%). The majority of missing values can be observed for the education variables. Furthermore, the work intensity variables also contain a fair amount of missings. Slightly more missings can be observed for fathers than for mothers. When examining missing values by country, I find that more than 10% of cases are missing in the UK and Norway. For the UK, I find that proxy interviews produce far more missing cases than in other countries. The majority of missing values in the U.K. can be attributed to cases in which a proxy interview was

3 This is due to the fact that information on income is imputed and information on age is derived from the sampling frame.

conducted. In Norway, the education variable produces the majority of missing values. This might have to do with the fact in the Norwegian SILC information on education is taken from registers.[4]

Table A.4 Missing values by country (in %)

	Own home	Mothers' education	Fathers' education	Work intensity (mother)	Work intensity (father)	Overall
Austria	0.0	0.0	0.0	0.0	0.0	0.0
Belgium	0.0	1.9	1.9	0.0	0.0	3.4
Bulgaria	0.0	0.0	0.0	0.0	0.0	0.0
Cyprus	0.0	0.0	0.0	0.0	0.0	0.0
Czech Republic	0.0	0.0	0.0	0.0	0.0	0.0
Denmark	0.0	4.0	1.7	1.0	1.3	6.9
Estonia	0.0	0.9	2.7	0.9	2.7	3.6
Finland	0.0	1.9	2.7	0.0	0.1	3.9
France	0.0	0.3	0.2	0.3	0.1	0.7
Greece	0.0	0.0	0.0	0.0	0.0	0.0
Hungary	0.2	0.0	0.0	0.0	0.2	0.4
Iceland	0.0	2.0	1.0	3.6	1.3	5.5
Ireland	0.0	1.8	2.7	0.0	0.0	3.2
Italy	0.0	0.0	0.0	0.0	0.0	0.0
Latvia	0.0	0.8	3.2	0.8	3.2	3.6
Luxembourg	0.0	0.7	1.1	0.0	0.0	1.4
Netherlands	0.0	3.6	3.6	0.4	0.1	5.9
Norway	0.7	8.0	4.4	1.6	1.1	12.9
Poland	0.0	0.0	0.0	0.0	0.0	0.0
Portugal	0.0	0.0	0.0	0.0	0.0	0.0
Romania	0.0	0.0	0.0	0.0	0.0	0.0
Slovakia	0.0	0.0	0.0	0.0	0.0	0.0
Slovenia	0.0	0.3	0.0	0.0	0.0	0.3
Spain	0.0	0.0	0.0	0.0	0.0	0.0
Sweden	0.3	0.6	0.6	2.1	1.1	4.2
United Kingdom	0.0	3.8	11.1	2.3	3.9	15.2
Overall	0.0	1.1	1.4	0.5	0.5	2.6

4 Compare the Norwegian intermediate quality report 2009, 2010 and questionnaires for 2004-2007.

Appendix C: Additional Descriptive Tables

Table A.5 Average income percentile by family type

	Marriage	Cohabitation	Single Parent
Austria	50.7	54.9	31.2
Belgium	58.2	60.8	20.5
Bulgaria	64.1	47.9	48.7
Cyprus	63.7	47.9	43.1
Czech Republic	72.0	56.5	45.0
Denmark	50.4	46.5	25.9
Estonia	76.3	71.7	46.4
Finland	55.9	47.7	18.3
France	55.6	50.6	28.3
Greece	62.1	43.7	25.8
Hungary	59.6	42.3	34.1
Iceland	49.5	42.4	20.4
Ireland	75.6	66.3	45.9
Italy	53.7	55.9	38.6
Latvia	72.1	61.7	49.0
Luxembourg	51.7	45.3	27.4
Netherlands	57.7	62.2	36.7
Norway	57.9	53.9	21.0
Poland	60.5	48.9	41.6
Portugal	61.9	57.6	47.4
Romania	56.7	36.3	25.8
Slovakia	65.3	59.4	42.6
Slovenia	62.7	56.3	33.6
Spain	66.2	52.2	31.5
Sweden	54.6	55.5	35.2
United Kingdom	66.3	44.7	38.3
Country mean	60.8	52.7	34.7

Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution due to small sample sizes (N<20)

Table A.6 Homeowners (in %)

	Marriage	Cohabitation	Single Parent
Austria	44.2	35.3	35.6
Belgium	71.5	71.3	37.3
Bulgaria	31.5	29.7	47.4
Cyprus	54.6	19.3	29.0
Czech Republic	69.2	52.0	14.6
Denmark	69.4	67.6	19.7
Estonia	58.4	57.9	44.8
Finland	70.7	63.3	32.8
France	55.0	43.4	46.5
Greece	50.0	19.7	38.2
Hungary	64.0	43.4	45.5
Iceland	79.6	69.2	56.5
Ireland	78.1	48.7	58.5
Italy	64.1	50.3	12.8
Latvia	58.3	33.8	94.8
Luxembourg	55.5	40.0	47.7
Netherlands	85.0	86.6	35.7
Norway	84.0	81.4	78.0
Poland	45.4	34.5	47.2
Portugal	61.4	51.9	52.7
Romania	47.1	20.7	22.6
Slovakia	49.4	56.7	53.2
Slovenia	53.3	47.3	42.4
Spain	81.2	67.6	44.0
Sweden	70.2	65.0	36.1
United Kingdom	74.8	42.7	42.3
Country mean	60.8	52.7	34.7

Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution due to small sample sizes (N<20)

Table A.7 Average age of parents by sex and family form

	Marriage		Cohabitation		Single Mother
	Mother	Father	Mother	Father	
Austria	28.4	32.4	26.9	30.4	26.0
Belgium	28.2	31.4	27.4	30.6	25.5
Bulgaria	25.3	28.6	23.2	27.3	22.6
Cyprus	28.2	31.0	26.6	31.8	23.3
Czech Republic	28.4	31.2	27.3	30.6	25.2
Denmark	29.5	32.3	28.4	30.4	28.5
Estonia	26.7	29.4	25.4	28.5	23.9
Finland	28.5	31.0	27.6	30.7	25.8
France	28.4	31.5	27.2	29.6	25.6
Greece	29.8	33.7	30.1	38.4	23.2
Hungary	27.9	30.8	24.9	28.2	25.2
Iceland	28.9	34.1	26.6	29.2	24.4
Ireland	31.7	33.8	27.7	30.8	23.7
Italy	29.9	33.2	29.7	33.5	30.2
Latvia	26.1	29.2	24.9	28.0	24.2
Luxembourg	28.9	32.2	28.8	32.6	24.7
Netherlands	29.1	31.6	29.2	31.8	28.6
Norway	29.1	32.4	27.2	30.3	26.3
Poland	26.8	29.1	26.3	29.6	23.7
Portugal	28.8	31.1	27.8	30.2	26.2
Romania	26.5	29.9	21.6	27.3	19.6
Slovakia	26.6	29.3	26.0	30.4	24.0
Slovenia	28.8	31.7	28.5	31.4	26.5
Spain	30.8	33.1	29.5	31.8	24.4
Sweden	28.9	31.5	27.6	29.9	27.7
United Kingdom	31.1	33.3	26.5	29.2	23.1
Country mean	28.6	31.5	27.3	30.5	25.3

Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution due to small sample sizes (N<20)

Table A.8 Parents with tertiary education by sex and family form (in %)

	Marriage		Cohabitation		Single Mother
	Mother	Father	Mother	Father	
Austria	30.4	25.5	22.7	23.5	7.7
Belgium	60.7	54.6	54.5	43.8	33.8
Bulgaria	29.1	30.3	9.4	6.5	19.9
Cyprus	68.3	52.5	42.9	36.7	9.2
Czech Republic	36.6	30.2	18.6	10.8	14.9
Denmark	52.2	41.3	51.0	36.3	46.1
Estonia	56.7	36.2	41.1	27.2	13.8
Finland	59.0	42.3	36.5	23.1	35.7
France	58.3	39.1	48.1	33.7	21.2
Greece	39.9	33.0	31.4	13.6	27.7
Hungary	37.6	26.6	15.3	8.6	13.8
Iceland	46.9	33.1	40.3	27.5	17.7
Ireland	70.1	59.4	59.2	42.6	16.1
Italy	25.5	19.4	22.4	15.3	21.7
Latvia	55.5	37.7	25.2	13.1	25.1
Luxembourg	47.9	36.4	28.9	16.4	12.8
Netherlands	48.4	44.6	50.7	41.3	17.9
Norway	66.8	55.5	42.1	29.7	11.6
Poland	48.0	34.9	28.2	21	25.0
Portugal	38.0	19.7	21.5	12.1	7.6
Romania	22.5	13.5	2.7	0.0	0.0
Slovakia	37.8	30.2	30.7	15.5	15.9
Slovenia	50.1	36.1	41.4	27.3	25.2
Spain	55.9	39.8	35.4	28.1	13.4
Sweden	64.7	52.5	47.2	35.2	37.4
United Kingdom	63.7	56.7	30.3	21.7	19.0
Country mean	48.9	37.7	33.8	23.5	19.6

Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution due to small sample sizes (N<20)

Table A.9 Parents' work intensity by family form

	Marriage		Cohabitation		Single Mother
	Mother	Father	Mother	Father	
Austria	49.3	91.2	58.0	90.7	52.1
Belgium	68.4	87.6	74.4	92.6	46.5
Bulgaria	55.1	82.5	40.1	69.3	37.8
Cyprus	73.7	94.5	50.9	71.7	10.7
Czech Republic	82.6	96.9	70.3	90.3	59.0
Denmark	59.2	86.6	55.9	83.8	52.8
Estonia	51.9	89.8	51.3	84.9	33.8
Finland	53.9	86.6	44.7	81.8	40.9
France	72.7	90.4	74.2	91.3	44.7
Greece	54.7	93.3	42.1	71.5	16.8
Hungary	47.2	92.2	33.6	75.7	34.0
Iceland	78.1	89.4	74.0	85.3	56.5
Ireland	69.9	85.5	51.5	79.7	35.3
Italy	57.4	92.4	61.0	83.1	55.9
Latvia	54.1	86.5	44.5	82.5	39.2
Luxembourg	70.3	93.0	73.6	93.1	43.4
Netherlands	61.0	91.3	67.0	91.0	58.4
Norway	63.7	89.3	64.4	89.1	42.9
Poland	69.0	88.6	45.3	83.1	45.5
Portugal	73.7	91.5	75.4	88.1	59.9
Romania	53.8	92.8	17.3	73.7	18.4
Slovakia	70.3	94.8	64.0	84.9	54.3
Slovenia	83.6	93.8	78.6	90.6	55.9
Spain	67.2	91.3	55.4	74.5	31.2
Sweden	63.8	85.8	68.3	91.7	51.4
United Kingdom	60.1	89.0	51.1	78.3	34.0
Country mean	64.0	90.3	57.2	83.6	42.7

Results for single parents (CY, DK, GR, RO) and cohabiters (GR, RO) must be interpreted with caution due to small sample sizes (N<20)

Appendix D: Additional Regression Tables

Table A.10 Regression model excluding problem countries (AME)

	Standard Model	Model excluding problematic countries
Age (mother)	0.342** (0.041)	0.340** (0.044)
Father younger (>5)	-0.262** (0.040)	-0.220** (0.045)
Father younger (4-5)	-0.110** (0.031)	-0.078* (0.030)
Father younger (2-3)	-0.085** (0.020)	-0.090** (0.023)
Same age +/-1	Ref.	Ref.
Father older (2-3)	0.006 (0.011)	0.008 (0.014)
Father older (4-5)	0.024 (0.013)	0.019 (0.015)
Father older (>5)	-0.026* (0.012)	-0.025 (0.014)
Equivalized income	-0.000 (0.000)	-0.000 (0.000)
Home ownership	0.048** (0.011)	0.052** (0.010)
Education (mother) Low	Ref.	Ref.
Medium	0.012 (0.015)	0.002 (0.018)
High	0.076** (0.018)	0.087** (0.021)
Education (father) Low	Ref.	Ref.
Medium	0.035* (0.014)	0.038* (0.017)
High	0.099** (0.018)	0.111** (0.021)
Work intensity (mother)	-0.031* (0.013)	-0.043* (0.015)
Work intensity (father)	0.057** (0.018)	0.052* (0.020)
Variance (Country)	1.570** (0.454)	1.585** (0.524)
N	12748	10160

Table A.11 Random intercept models with level 1 predictors (AME)

	m 1	m 2	m 3	m 4	m 5	m 6	m 7
Age (mother)		0.495**	0.455**	0.421**	0.356**	0.338**	0.342**
		(0.048)	(0.047)	(0.046)	(0.042)	(0.041)	(0.041)
Father younger (>5)		-0.325**	-0.313**	-0.303**	-0.285**	-0.267**	-0.262**
		(0.039)	(0.039)	(0.040)	(0.040)	(0.040)	(0.040)
Father younger (4-5)		-0.138**	-0.130**	-0.124**	-0.118**	-0.112**	-0.110**
		(0.032)	(0.032)	(0.032)	(0.032)	(0.031)	(0.031)
Father younger (2-3)		-0.103**	-0.099**	-0.095**	-0.088**	-0.086**	-0.085**
		(0.021)	(0.021)	(0.020)	(0.020)	(0.020)	(0.020)
Same age +/-1		Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Father older (2-3)		0.005	0.005	0.004	0.006	0.007	0.006
		(0.011)	(0.011)	(0.011)	(0.011)	(0.011)	(0.011)
Father older (4-5)		0.021	0.020	0.019	0.025	0.026*	0.024
		(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Father older (>5)		-0.030*	-0.029*	-0.032*	-0.026*	-0.024	-0.026*
		(0.012)	(0.012)	(0.013)	(0.012)	(0.012)	(0.012)
Equivalized income			0.001**	0.000*	-0.000	-0.000	-0.000
			(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Home ownership				0.052**	0.049**	0.049**	0.048**
				(0.011)	(0.011)	(0.011)	(0.011)
Education (mother) Low					Ref.	Ref.	Ref.
Medium					0.025	0.010	0.012
					(0.015)	(0.015)	(0.015)
High					0.107**	0.072**	0.076**
					(0.019)	(0.018)	(0.018)
Education (father) Low						Ref.	Ref.
Medium						0.036*	0.035*
						(0.014)	(0.014)
High						0.100**	0.099**
						(0.018)	(0.018)
Work intensity (mother)							-0.031*
							(0.013)
Work intensity (father)							0.057**
							(0.018)
Variance (Country)	1.361**	1.449**	1.442**	1.487**	1.549**	1.586**	1.570**
	(0.396)	(0.420)	(0.418)	(0.431)	(0.448)	(0.458)	(0.454)
Deviance (-2 ll)	14243	13815	13806	13779	13700	13648	13630
ICC	0.293	0.306	0.305	0.311	0.320	0.325	0.323

Average marginal effects and standard errors; N=12748; * $p < .05$, ** $p < .01$, fixed effects for years not shown

Table A.12 Random slope models (AME)

	m 8	m 9	m 10	m 11	m 12	m 13	m 14
Equivalized income	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Home ownership	0.048**	0.049**	0.048**	0.047**	0.047**	0.045**	0.045**
	(0.011)	(0.011)	(0.010)	(0.010)	(0.010)	(0.010)	(0.009)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.016	0.011	0.010	0.009	0.009	0.009	0.018
	(0.025)	(0.021)	(0.019)	(0.019)	(0.018)	(0.018)	(0.016)
High	0.084**	0.073**	0.070**	0.068**	0.068**	0.066**	0.079**
	(0.027)	(0.022)	(0.020)	(0.020)	(0.019)	(0.019)	(0.017)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.036*	0.038**	0.036**	0.035**	0.035**	0.034**	0.032*
	(0.014)	(0.014)	(0.014)	(0.013)	(0.013)	(0.013)	(0.012)
High	0.101**	0.104**	0.101**	0.098**	0.098**	0.096**	0.093**
	(0.018)	(0.018)	(0.016)	(0.016)	(0.016)	(0.015)	(0.015)
Work intensity (mother)	-0.033*	-0.028*	-0.027*	-0.026*	-0.026*	-0.025*	-0.026*
	(0.013)	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)	(0.012)
Work intensity (father)	0.053**	0.051**	0.050**	0.049**	0.051**	0.050**	0.048**
	(0.017)	(0.018)	(0.017)	(0.016)	(0.016)	(0.016)	(0.016)
Child care enrolment			-0.008**	-0.105**	-0.002	-0.000	0.003
			(0.002)	(0.020)	(0.003)	(0.002)	(0.003)
Acceptance				-0.136**	-0.008**	-0.005	-0.005
				(0.021)	(0.003)	(0.003)	(0.003)
Unemployment rate					0.005	0.005	0.005
					(0.003)	(0.003)	(0.003)
Gender role attitudes index						-0.016*	-0.015*
						(0.007)	(0.007)
Educ.(m) medium*Child care							-0.003*
							(0.001)
Educ.(m) high * Child care							-0.005**
							(0.001)
Educ.(m) medium *Acceptance							-0.002
							(0.001)
Educ.(m) high * Acceptance							0.001
							(0.001)
Equivalized income*Acceptance							-0.000
							(0.000)
Variance (Educ.(m) medium)	0.177	0.082	0.072	0.099	0.096	0.097	0.000**
	(0.101)	(0.057)	(0.048)	(0.064)	(0.062)	(0.063)	(0.000)
Variance (Educ.(m) high)	0.238*	0.071	0.052	0.066	0.065	0.062	0.025
	(0.113)	(0.054)	(0.043)	(0.064)	(0.062)	(0.064)	(0.031)
Variance (Equivalized income)		0.000**	0.000**	0.000**	0.000**	0.000**	0.012
		(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.022)
Variance (Country)	1.257**	1.409**	0.928**	0.611**	0.590**	0.480**	0.588**
	(0.389)	(0.424)	(0.282)	(0.192)	(0.186)	(0.156)	(0.185)
Deviance (-2 ll)	13592	13543	13533	13517	13514	13509	13488
ICC	.276	.300	.220	.157	.152	.127	.151

Average marginal effects, standard errors in parentheses; N=12748 ; * p < .05, ** p < .01; year fixed effects, age and age differences not shown

Table A.13 Testing individual random slopes

	No random slopes	Education mother	Education father	Home ownership	Household income
Equivalized income	-0.002	-0.002	-0.002	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Home ownership	0.237**	0.235**	0.236**	0.239**	0.239**
	(0.050)	(0.050)	(0.050)	(0.068)	(0.068)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.056	0.061	0.077	0.056	0.069
	(0.072)	(0.072)	(0.117)	(0.072)	(0.073)
High	0.378**	0.386**	0.417**	0.382**	0.380**
	(0.082)	(0.082)	(0.135)	(0.082)	(0.083)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.165*	0.196**	0.169**	0.163*	0.171**
	(0.065)	(0.073)	(0.065)	(0.065)	(0.065)
High	0.491**	0.568**	0.505**	0.491**	0.510**
	(0.076)	(0.111)	(0.077)	(0.076)	(0.076)
Work intensity (mother)	-0.157*	-0.158*	-0.165**	-0.157*	-0.134*
	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)
Work intensity (father)	0.287**	0.276**	0.268**	0.282**	0.258**
	(0.085)	(0.085)	(0.086)	(0.085)	(0.085)
Constant	0.647*	0.608*	0.639*	0.657*	0.636*
	(0.273)	(0.271)	(0.252)	(0.270)	(0.270)
Variance (Educ.(m) medium)		0.177			
		(0.101)			
Variance (Educ.(m) high)		0.238*			
		(0.113)			
Variance (Educ.(f) medium)			0.014		
			(0.033)		
Variance (Educ.(f) high)			0.124		
			(0.064)		
Variance (Home ownership)				0.046	
				(0.031)	
Variance (Equivalized income)					0.000*
					(0.000)
Variance (Country)	1.570**	1.545**	1.257**	1.529**	1.591**
	(0.454)	(0.453)	(0.389)	(0.445)	(0.461)
Deviance (-2 ll)	13630	13603	13592	13625	13559
ICC	0.323	0.276	0.320	0.317	0.326

Logit Coefficients and standard errors; N=12748; * p < .05, ** p < .01; year fixed effects, age and age differences not shown

Table A.14 Testing individual cross level interactions (fixed part)

	Educ. (f)* acceptance	Ownhome* acceptance	HHincome* acceptance	Educ. (m)* acceptance	Educ. (m)** Child care enrl.
Equivalized income	-0.002	-0.002	-0.001	-0.002*	-0.002*
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Home ownership	0.240**	0.251**	0.246**	0.241**	0.239**
	(0.050)	(0.069)	(0.050)	(0.050)	(0.050)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.047	0.050	0.062	0.090	0.105
	(0.072)	(0.072)	(0.073)	(0.095)	(0.099)
High	0.378**	0.379**	0.377**	0.461**	0.418**
	(0.082)	(0.082)	(0.082)	(0.107)	(0.125)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.212**	0.161*	0.169**	0.163*	0.161*
	(0.066)	(0.065)	(0.065)	(0.065)	(0.065)
High	0.600**	0.491**	0.511**	0.505**	0.503**
	(0.110)	(0.076)	(0.076)	(0.076)	(0.076)
Work intensity (mother)	-0.158*	-0.156*	-0.133*	-0.166**	-0.162*
	(0.064)	(0.064)	(0.064)	(0.064)	(0.064)
Work intensity (father)	0.289**	0.296**	0.274**	0.274**	0.283**
	(0.085)	(0.085)	(0.086)	(0.086)	(0.086)
Child care enrolment	-0.000	-0.004	-0.002	0.012	-0.008
	(0.013)	(0.012)	(0.014)	(0.012)	(0.011)
Acceptance	-0.019	-0.026	-0.029	-0.025	-0.009
	(0.016)	(0.016)	(0.016)	(0.015)	(0.015)
Unemployment rate	0.006	0.007	0.007*	0.006	0.006
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Gender role attitudes index	-0.093*	-0.090**	-0.086*	-0.078*	-0.080*
	(0.038)	(0.034)	(0.039)	(0.035)	(0.035)
Educ.(f) medium*Acceptance	-0.013**				
	(0.004)				
Educ.(f) high*Acceptance	-0.015*				
	(0.007)				
Home Ownership *Acceptance		-0.005			
		(0.005)			
Eq. Income*Acceptance			-0.000		
			(0.000)		
Educ.(m) medium*Acceptance				-0.025**	
				(0.007)	
Educ.(m) high*Acceptance				-0.028**	
				(0.008)	
Educ.(m) medium*Child care					-0.025**
					(0.006)
Educ.(m) high*Child care					-0.033**
					(0.006)
_cons	0.640**	0.652**	0.667**	0.611**	0.542**
	(0.191)	(0.185)	(0.194)	(0.175)	(0.176)

Logit Coefficients and standard errors; N=12748; * p < .05, ** p < .01; year fixed effects, age and age differences not shown

Table A.15 Testing individual cross level interactions (random part)

	Educ. (d)* acceptance	Ownhome* acceptance	HHincome* acceptance	Educ. (m)* acceptance	Educ. (m)* Child care enrl.
Variance (Educ.(d) medium)	-0.013** (0.004)				
Variance (Educ.(d) high)	-0.015* (0.007)				
Variance (Home ownership)		-0.005 (0.005)			
Variance (Equivalized income)			-0.000 (0.000)		
Variance (Educ.(m) medium)				0.077 (0.054)	0.089 (0.062)
Variance (Educ.(m) high)				0.114 (0.064)	0.212* (0.099)
Variance (Country)	0.584** (0.180)	0.553** (0.172)	0.606** (0.186)	0.485** (0.157)	0.461** (0.153)
Deviance (-2 ll)	13571	13589	13530	13528	13489
ICC	.151	.143	.156	.128	.122

Logit Coefficients and standard errors; N=12748; * p < .05, ** p < .01; year fixed effects, age and age differences not shown

Table A.16 Models excluding individual countries

	Full model	wo BE	wo DK	wo GR	wo ES	wo FR
Equivalized income	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Home ownership	0.245**	0.255**	0.244**	0.243**	0.237**	0.236**
	(0.050)	(0.051)	(0.051)	(0.050)	(0.052)	(0.053)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.095	0.095	0.092	0.086	0.048	0.121
	(0.082)	(0.084)	(0.083)	(0.083)	(0.085)	(0.086)
High	0.432**	0.438**	0.439**	0.429**	0.388**	0.453**
	(0.091)	(0.092)	(0.092)	(0.091)	(0.098)	(0.091)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.169**	0.178**	0.173**	0.170**	0.211**	0.184**
	(0.065)	(0.066)	(0.066)	(0.065)	(0.069)	(0.068)
High	0.515**	0.523**	0.528**	0.516**	0.567**	0.552**
	(0.077)	(0.078)	(0.078)	(0.077)	(0.082)	(0.080)
Work intensity (mother)	-0.143*	-0.122	-0.146*	-0.140*	-0.158*	-0.108
	(0.064)	(0.065)	(0.066)	(0.065)	(0.067)	(0.067)
Work intensity (father)	0.264**	0.288**	0.271**	0.261**	0.246**	0.318**
	(0.087)	(0.088)	(0.088)	(0.087)	(0.090)	(0.090)
Child care enrolment	0.015	0.016	0.012	0.020	0.016	0.015
	(0.014)	(0.015)	(0.015)	(0.011)	(0.015)	(0.015)
Acceptance	-0.026	-0.024	-0.023	-0.035**	-0.025	-0.028
	(0.017)	(0.017)	(0.017)	(0.013)	(0.017)	(0.018)
Unemployment rate	0.027	0.027	0.027	0.028*	0.025	0.024
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.004)
Gender role attitudes index	-0.084*	-0.090*	-0.094*	-0.054	-0.084*	-0.083*
	(0.039)	(0.040)	(0.040)	(0.030)	(0.039)	(0.040)
Educ.(m) medium*Child care	-0.015*	-0.014*	-0.015*	-0.014*	-0.015*	-0.015*
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Educ.(m) high * Child care	-0.029**	-0.027**	-0.028**	-0.029**	-0.029**	-0.030**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Educ.(m) medium *Acceptance	-0.011	-0.011	-0.011	-0.011	-0.012	-0.007
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)
Educ.(m) high * Acceptance	0.004	0.004	0.004	0.004	0.003	0.010
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Equivalized income*Acceptance	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.645**	0.632**	0.623**	0.537**	0.587**	0.694**
	(0.193)	(0.199)	(0.197)	(0.165)	(0.202)	(0.202)
N	12748	12435	12462	12283	11745	11891
Deviance (-2 ll)	13488	13060	13087	13419	12497	12369

Logit coeff.; s.e. in parentheses; N=12748; * $p < .05$, ** $p < .01$; year fixed effects, age and age diff. not shown; Random component not shown

Table A.17 Models excluding individual countries II

	wo NL	wo AT	wo PT	wo FI	wo SE	wo UK	wo BG	wo CY	wo CZ
Equivalized income	0.000	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Home ownership	0.242**	0.243**	0.251**	0.256**	0.251**	0.238**	0.247**	0.235**	0.232**
	(0.051)	(0.051)	(0.051)	(0.052)	(0.052)	(0.051)	(0.051)	(0.051)	(0.052)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.095	0.128	0.054	0.098	0.106	0.109	0.103	0.139	0.117
	(0.083)	(0.085)	(0.081)	(0.086)	(0.083)	(0.083)	(0.083)	(0.077)	(0.083)
High	0.443**	0.471**	0.398**	0.424**	0.444**	0.450**	0.433**	0.454**	0.444**
	(0.091)	(0.092)	(0.092)	(0.094)	(0.092)	(0.091)	(0.092)	(0.091)	(0.094)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.153*	0.194**	0.186**	0.157*	0.168*	0.173**	0.174**	0.160*	0.168*
	(0.067)	(0.066)	(0.066)	(0.067)	(0.066)	(0.066)	(0.066)	(0.066)	(0.065)
High	0.505**	0.548**	0.532**	0.490**	0.491**	0.498**	0.517**	0.507**	0.494**
	(0.079)	(0.078)	(0.077)	(0.079)	(0.078)	(0.078)	(0.077)	(0.077)	(0.077)
Work intensity (mother)	-0.147*	-0.122	-0.144*	-0.171**	-0.121	-0.138*	-0.138*	-0.156*	-0.159*
	(0.066)	(0.066)	(0.065)	(0.066)	(0.067)	(0.066)	(0.065)	(0.065)	(0.066)
Work intensity (father)	0.259**	0.272**	0.256**	0.254**	0.320**	0.265**	0.275**	0.232**	0.262**
	(0.089)	(0.088)	(0.088)	(0.090)	(0.089)	(0.089)	(0.088)	(0.087)	(0.087)
Child care enrolment	0.012	0.020	0.017	0.014	0.016	0.017	0.016	0.017	0.011
	(0.015)	(0.016)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.017)	(0.014)
Acceptance	-0.025	-0.029	-0.026	-0.025	-0.026	-0.026	-0.025	-0.025	-0.025
	(0.017)	(0.019)	(0.018)	(0.017)	(0.017)	(0.017)	(0.018)	(0.020)	(0.017)
Unemployment rate	0.027	0.023	0.032*	0.035*	0.033*	0.025	0.028	0.027	0.021
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Gender role attitudes index	-0.083*	-0.086*	-0.080	-0.082*	-0.089*	-0.085*	-0.085*	-0.093*	-0.083*
	(0.039)	(0.041)	(0.041)	(0.039)	(0.041)	(0.040)	(0.041)	(0.043)	(0.038)
Educ.(m) medium*Child care	-0.014*	-0.022**	-0.018**	-0.015*	-0.014*	-0.015*	-0.015*	-0.009	-0.016*
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)
Educ.(m) high * Child care	-0.025**	-0.038**	-0.031**	-0.028**	-0.028**	-0.030**	-0.029**	-0.027**	-0.029**

	wo NL	wo AT	wo PT	wo FI	wo SE	wo UK	wo BG	wo CY	wo CZ
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Educ.(m) medium *Acceptance	-0.011	-0.005	-0.010	-0.010	-0.010	-0.010	-0.011	-0.019**	-0.011
	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Educ.(m) high * Acceptance	0.003	0.012	0.005	0.003	0.004	0.005	0.004	0.002	0.004
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Equivalized income*Acceptance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.642**	0.581**	0.636**	0.732**	0.622**	0.648**	0.629**	0.657**	0.681**
	(0.198)	(0.201)	(0.201)	(0.200)	(0.200)	(0.198)	(0.199)	(0.201)	(0.193)
N	12063	12364	12502	12104	12151	12231	12574	12453	12273
Deviance (-2 ll)	12577	13013	13197	12624	12691	12928	13285	13284	12951

Logit coeff.; s.e. in parentheses; N=12748; * p < .05, ** p < .01; year fixed effects, age and age diff. not shown; Random component not shown

Table A.18 Models excluding individual countries III

	wo EE	wo HU	wo LV	wo PO	wo RO	wo SK	wo SI	wo IS	wo NO
Equivalized income	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Home ownership	0.265**	0.249**	0.235**	0.253**	0.246**	0.255**	0.264**	0.242**	0.249**
	(0.051)	(0.051)	(0.052)	(0.051)	(0.051)	(0.051)	(0.051)	(0.053)	(0.051)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.101	0.122	0.071	0.056	0.089	0.084	0.09	0.099	0.104
	(0.086)	(0.086)	(0.084)	(0.078)	(0.083)	(0.084)	(0.085)	(0.084)	(0.078)
High	0.437**	0.464**	0.404**	0.409**	0.432**	0.426**	0.431**	0.442**	0.423**
	(0.094)	(0.094)	(0.093)	(0.096)	(0.091)	(0.092)	(0.093)	(0.092)	(0.087)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.173**	0.140*	0.154*	0.163*	0.159*	0.171**	0.161*	0.165*	0.178**
	(0.066)	(0.066)	(0.066)	(0.066)	(0.065)	(0.065)	(0.067)	(0.066)	(0.066)
High	0.515**	0.481**	0.494**	0.519**	0.506**	0.511**	0.515**	0.517**	0.502**
	(0.078)	(0.077)	(0.078)	(0.077)	(0.077)	(0.077)	(0.078)	(0.078)	(0.078)
Work intensity (mother)	-0.153*	-0.151*	-0.132*	-0.179**	-0.147*	-0.143*	-0.169*	-0.144*	-0.140*
	(0.066)	(0.066)	(0.065)	(0.066)	(0.065)	(0.065)	(0.067)	(0.065)	(0.066)
Work intensity (father)	0.253**	0.252**	0.274**	0.254**	0.258**	0.256**	0.246**	0.267**	0.285**
	(0.088)	(0.089)	(0.088)	(0.089)	(0.087)	(0.087)	(0.089)	(0.087)	(0.088)
Child care enrolment	0.011	0.016	0.011	0.013	0.017	0.015	0.016	0.018	0.017
	(0.014)	(0.015)	(0.015)	(0.015)	(0.014)	(0.015)	(0.014)	(0.014)	(0.015)
Acceptance	-0.019	-0.026	-0.023	-0.026	-0.022	-0.023	-0.027	-0.025	-0.025
	(0.016)	(0.017)	(0.017)	(0.017)	(0.016)	(0.021)	(0.017)	(0.017)	(0.018)
Unemployment rate	0.028	0.033*	0.034*	0.037*	0.025	0.025	0.026	0.027	0.032*
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Gender role attitudes index	-0.094**	-0.082*	-0.082*	-0.083*	-0.089*	-0.089*	-0.080*	-0.082*	-0.087*
	(0.036)	(0.040)	(0.039)	(0.040)	(0.037)	(0.044)	(0.039)	(0.037)	(0.044)
Educ.(m) medium*Child care	-0.016*	-0.017*	-0.012	-0.009	-0.014*	-0.015*	-0.015*	-0.015*	-0.014*
	(0.007)	(0.007)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.006)
Educ.(m) high * Child care	-0.029**	-0.031**	-0.025**	-0.025**	-0.028**	-0.028**	-0.028**	-0.028**	-0.032**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)

	wo EE	wo HU	wo LV	wo PO	wo RO	wo SK	wo SI	wo IS	wo NO
Educ.(m) medium *Acceptance	-0.010	-0.010	-0.012	-0.012	-0.010	-0.009	-0.010	-0.011	-0.012
	(0.008)	(0.008)	(0.007)	(0.006)	(0.007)	(0.008)	(0.008)	(0.008)	(0.007)
Educ.(m) high * Acceptance	0.005	0.005	0.002	0.004	0.004	0.005	0.004	0.005	0.006
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.007)
Equivalized income*Acceptance	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.644**	0.650**	0.703**	0.636**	0.599**	0.623**	0.670**	0.716**	0.676**
	(0.187)	(0.199)	(0.197)	(0.199)	(0.189)	(0.200)	(0.197)	(0.192)	(0.201)
N	12421	12304	12508	11774	12620	12436	12165	12454	12353
Deviance (-2 ll)	13088	12978	13199	12933	13421	13330	12687	13210	12976

Logit coeff.; s.e. in parentheses; N=12748; * $p < .05$, ** $p < .01$; year fixed effects, age and age diff. not shown; Random component not shown

Table A.19 Models by country I

	BE	DK	GR	ES	FR	IE	IT	LU	NL
Equivalized income	0.000	0.007	-0.022	-0.005	0.002	0.003	-0.014**	0.002	-0.008
	(0.007)	(0.007)	(0.042)	(0.004)	(0.004)	(0.012)	(0.004)	(0.006)	(0.005)
Home ownership	-0.001	0.48	1.580	0.384	0.397*	0.733	0.516**	0.38	0.101
	(0.318)	(0.343)	(1.751)	(0.201)	(0.169)	(0.545)	(0.162)	(0.247)	(0.287)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	-0.351	-0.468	3.606	0.287	-0.602*	-0.841	0.326	0.038	-0.66
	(0.466)	(0.621)	(2.319)	(0.231)	(0.285)	(0.861)	(0.185)	(0.308)	(0.374)
High	-0.107	-0.63	2.259	0.537*	-0.129	-0.023	0.431	0.604	-0.739
	(0.532)	(0.63)	(2.824)	(0.233)	(0.301)	(0.852)	(0.241)	(0.392)	(0.393)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	0.049	-0.154	0.516	-0.08	0.033	0.774	0.294	0.099	0.354
	(0.368)	(0.499)	(2.112)	(0.211)	(0.236)	(0.599)	(0.171)	(0.283)	(0.282)
High	0.358	-0.058	-0.709	0.188	0.214	0.621	0.148	0.439	0.622*
	(0.405)	(0.532)	(2.642)	(0.231)	(0.262)	(0.631)	(0.242)	(0.385)	(0.307)
Work intensity (mother)	-0.883*	-0.238	0.65	0.061	-0.521*	-0.28	-0.396	-0.656*	-0.237
	(0.435)	(0.36)	(2.626)	(0.242)	(0.244)	(0.571)	(0.208)	(0.33)	(0.318)
Work intensity (father)	-0.55	0.141	-3.155	0.538	-0.299	-1.075	1.005**	-0.391	0.141
	(0.58)	(0.499)	(3.450)	(0.314)	(0.313)	(0.792)	(0.268)	(0.552)	(0.413)
Constant	1.069	0.322	0.903	1.038**	-0.541	-0.092	1.499**	0.658	0.971
	(0.653)	(0.808)	(2.196)	(0.367)	(0.409)	(0.98)	(0.348)	(0.522)	(0.527)
N	312	286	56	1003	857	215	1348	547	685
Deviance (-2 ll)	400	374	23	955	1079	183	1235	569	880

Logit coeff.; s.e. in parentheses; * $p < .05$, ** $p < .01$; year fixed effects, age and age diff. not shown

Table A.20 Models by country II

	AT	PT	FI	SE	UK	BG	CY	CZ	EE
Equivalized income	-0.007	-0.003	0.003	-0.004	0.010*	0.008	-0.016	0.005	-0.005
	(0.006)	(0.009)	(0.005)	(0.005)	(0.005)	(0.008)	(0.012)	(0.005)	(0.007)
Home ownership	0.071	-0.176	0.006	0.161	0.34	-0.025	1.144*	0.605*	0.013
	(0.276)	(0.386)	(0.218)	(0.21)	(0.277)	(0.442)	(0.54)	(0.247)	(0.317)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	-0.097	1.179**	0.071	-0.617	0.175	0.2	-1.757	0.213	0.13
	(0.428)	(0.432)	(0.374)	(0.417)	(0.612)	(0.69)	(0.912)	(0.569)	(0.411)
High	0.361	1.397*	0.684	-0.065	0.304	0.541	-1.291	0.857	0.585
	(0.522)	(0.619)	(0.404)	(0.441)	(0.627)	(0.947)	(0.974)	(0.638)	(0.532)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	-1.052*	-0.41	0.349	0.15	0.099	0.215	1.085	1.183	0.059
	(0.492)	(0.441)	(0.284)	(0.39)	(0.466)	(0.729)	(0.603)	(0.775)	(0.393)
High	-0.941	-0.525	0.888**	0.682	0.836	1.118	1.618*	2.295**	0.59
	(0.565)	(0.697)	(0.319)	(0.417)	(0.484)	(1.014)	(0.666)	(0.852)	(0.502)

Work intensity (mother)	-0.807*	-0.075	0.379	-0.422	-0.308	-0.213	0.203	0.421	-0.227
	(0.367)	(0.463)	(0.286)	(0.271)	(0.319)	(0.582)	(0.621)	(0.37)	(0.408)
Work intensity (father)	0.05	0.358	0.425	-0.632	0.151	0.16	2.415**	0.715	0.696
	(0.538)	(0.677)	(0.351)	(0.417)	(0.415)	(0.574)	(0.791)	(0.774)	(0.564)
Constant	2.497**	1.424*	-0.538	-0.031	-0.502	1.407	3.494**	-0.201	-0.968
	(0.783)	(0.618)	(0.521)	(0.597)	(0.688)	(0.792)	(1.239)	(0.971)	(0.607)
N	384	246	644	597	517	174	295	475	314
Deviance (-2 ll)	430	260	814	740	499	189	161	501	348

Logit coeff.; s.e. in parentheses; * $p < .05$, ** $p < .01$; year fixed effects, age and age diff. not shown

Table A.21 Models by country III

	HU	LV	PL	RO	SK	SI	IS	NO
Equivalized income	0	0.009	-0.002	-0.001	0.038*	-0.006	0.001	-0.002
	(0.005)	(0.008)	(0.006)	(0.023)	(0.016)	(0.004)	(0.008)	(0.006)
Home ownership	0.122	0.716*	0.069	-1.368	-0.931	-0.033	0.377	-0.138
	(0.258)	(0.341)	(0.278)	(1.357)	(0.712)	(0.193)	(0.458)	(0.371)
Education (mother) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	-0.399	1.240*	1.475**	1.240	-0.02	-0.069	-0.462	-0.307
	(0.432)	(0.526)	(0.378)	(1.709)	(0.689)	(0.418)	(0.517)	(0.433)
High	0.055	2.161**	1.856**	1.581	0	0.259	-0.844	0.426
	(0.533)	(0.636)	(0.523)	(2.602)	(.)	(0.457)	(0.551)	(0.445)
Education (father) Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Medium	1.560**	0.673	0.296	1.817	-3.321	0.292	0.585	0.072
	(0.442)	(0.466)	(0.376)	(1.406)	(2.854)	(0.315)	(0.462)	(0.451)
High	2.211**	1.245*	0.08	0	-2.004	0.57	0.567	0.925
	(0.571)	(0.573)	(0.54)	(.)	(2.899)	(0.373)	(0.54)	(0.486)
Work intensity (mother)	-0.095	-0.631	0.666	-1.421	-0.432	0.725*	0.099	-0.259
	(0.369)	(0.473)	(0.347)	(1.717)	(0.833)	(0.298)	(0.539)	(0.333)
Work intensity (father)	0.342	-0.317	0.58	4.686	1.678	0.885*	0.121	-0.295
	(0.448)	(0.526)	(0.388)	(2.565)	(1.733)	(0.398)	(0.747)	(0.483)
Constant	0.104	-2.170**	1.570**	-1.164	4.374	0.563	-2.088*	-0.717
	(0.563)	(0.779)	(0.59)	(1.837)	(2.985)	(0.571)	(0.899)	(0.684)
N	444	237	958	69	127	583	279	390
Deviance (-2 ll)	483	258	505	38	83	757	230	475

Logit coeff.; s.e. in parentheses; * $p < .05$, ** $p < .01$; year fixed effects, age and age diff. not shown

Lists of Graphs, Tables and Abbreviations

Graphs

Tables

Abbreviations

AC	Absolute change
CAGR	Compound anual growth rate
EC	European Commision
ECHP	European Community Household Panel
ESEC	European Socio-economic Classification
ESS	European Social Survey
EU	European Union
EU-LFS	European Union Labor Force Survey
EU-SILC	European Union Statistics on Income and Living Conditions
EVS	European Values
FFS	Fertility and Family Survey
GDP	Gross domestic product
GGS	Generations and Gender Survey
ICC	Intraclass correlation coefficient
IECM	Integrated European Census Microdata
ILO	International Labor Office
IPUMS	Integrated Public Use Microdata Series
ISCED	International Standard Classification of Education
ISSP	International Social Survey Programme
KILM	Key Indicators of the Labor Market
LFS	Labor Force Survey
LIS	Luxemburg Income Study
ll	Log likelihood
LM	Lagrange multiplier
LR	Likelihood ratio
N	Sample size
NMF	Non-marital fertility
OECD	Organisation for Economic Co-operation and Development
p	p-value
QQ	Quantile-Quantile
R^2	Coefficient of determination
Ref.	Reference category
s.e.	Standard errors
SILC	Statistics on Income and Living Conditions
TSCS	Time-series cross-section
UDB	User Database
UNECE	United Nations Economic Commission for Europe
WVS	World Values Survey

ISO 3166 country codes (2-digits)

AT	Austria
BE	Belgium
BG	Bulgaria
CY	Cyprus
CZ	Czech Republic
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GR	Greece
HU	Hungary
IE	Ireland
IS	Iceland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia
NL	Netherlands
NO	Norway
PL	Poland
PT	Portugal
RO	Romania
SE	Sweden
SI	Slovenia
SK	Slovak Republic
UK	United Kingdom
US	United States

Over the last 50 years the life courses of young people and their family formation behavior have undergone dramatic changes. Childbearing outside marriage, whether to single mothers or cohabiters, is one of the most prominent indicators of this process. This study outlines the development of childbearing outside of marriage in Europe since the 1960s. Changes in women‘s role in society are identified as the key factor driving this development. Utilizing the full potential of multi-level modeling the study finds that parents’ decision making is mediated by country specific welfare arrangements. In particular, the degree to which women can utilize their socioeconomic resources in the labor market plays a key role in the decision whether or not to marry the father of their child.

In den letzten 50 Jahren haben sich die Lebensverläufe junger Menschen und ihre Familienbildung dramatisch verändert. Außereheliche Fertilität, von Alleinstehenden oder unverheirateten Paaren, ist einer der wichtigsten Indikatoren für diesen Prozess. Diese Studie betrachtet die Entwicklung außerehelicher Fertilität in Europa seit den 1960ern. Als zentraler Faktor für diese Entwicklung wird der Wandel der gesellschaftlichen Rolle der Frau identifiziert. Auf Basis von Mehrebenenmodellen zeigt sich, dass Entscheidungsprozesse junger Eltern eng mit der Ausgestaltung des Wohlfahrtsstaates verknüpft sind. Im Speziellen ist das Heiratsverhalten junger Mütter davon geprägt, wie sie ihre sozioökonomischen Ressourcen am Arbeitsmarkt verwerten können.

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